

# The Iron Age

## A Review of the Hardware and Metal Trades.

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### The Progress of the Hot Blast.

The application of a heated blast to the production of iron in the blast furnace has generally, and to a certain extent correctly, been attributed to Jas. Beaumont Neilson, manager of the gas works at Glasgow, who, in 1828, patented what he entitled an "improved application of air to produce heat in fires, forges, and furnaces where bellows or other blowing apparatus are required." The principle of this invention, and indeed of all the iron hot blasts which have followed it, was to pass the blast intended for heating iron or reducing ore through an iron chamber heated considerably above the ordinary temperature of the blast. This chamber was only to be heated to redness, but produced such a wonderful economy of fuel at even a lower temperature, that attention was at once drawn to heating the blast in the best and most economical manner. It was not, however, until 1832, and some four years after Neilson's patent was granted, and also after several failures, that the use of hot blast was introduced. It is unnecessary here to describe in detail the construction of Neilson's earlier hot blast apparatus. Wrought iron pipes were first tried and found to corrode too quickly, and finally the first successful arrangement was that of horizontal cast iron pipes 18 inches diameter and united by flanges; these presented a heating surface of only 240 square feet, but it is said to have raised the temperature of the blast to 600°, or sufficient at least to melt lead.

Difficulties from contraction and expansion here arose and terminated the use of this system, which was supplemented by Neilson with a "cast iron tubular oven," consisting of cast iron cylindrical parallel mains, horizontally placed and connected by a series of smaller arched pipes, the ends of which were fitted into the mains. The fire was made between these in a grate, and the whole inclosed in a semi-circular arch of brick connecting with a flue. Upon this all the modern plans of iron hot blast apparatus are simply improvements. Neilson's original idea of heating the blast by a separate fire soon, however, gave way to the use of the waste gases from the tunnel head of the blast furnace itself. This innovation was the subject of continuous and acrimonious discussion at the time of its introduction, and to this day has its opponents among a certain few. The consumption of waste gases has, however, become almost universal in the modern blast furnace plant, and is applied to the generation of steam, and the roasting of ores, as well as to that of heating the blast. Indeed, at some points on the Continent these gases are used in charring wood, the production of pyrolytic acid, etc., etc.

The progress of the iron hot blast apparatus, both in Europe and the United States, has been simply a continuance in the track laid out by Neilson, viz., in the construction of pipe ovens of different forms and arrangements in which the blast is passed over the heated inner surface of cast iron pipes, the source of heat being the combustion of gas in a chamber or species of furnace in which the pipes are placed. The principal improvement in this system is due to John Player, which overcame the previous difficulty in entirely consuming the gases around the pipes without destroying the pipes themselves entirely. Player's stove consisted of a combination of a fire brick chamber with openings in the top of the arch in which the furnace gases are burned with an admixture of atmospheric air. Through the openings in this arch the flames ascend into a chamber containing the cast iron pipes through which the air to be heated passes, and which are maintained at a red heat. The pipes are arranged in the figure of a siphon, and in the ordinary Player stove contain about 1000 square feet of heating surface, or sufficient to heat 2300 cubic feet of air per minute to 1200° Fah. The advantages of the Player stove were a longer life to the pipes and maintenance of a greater uniformity of temperature. They have been and are still in general use in this country to a great extent, and have not probably been materially improved upon by any form of pipe stove since invented, and of which there have been several. The primary objections to pipe stoves, and they may be considered also final objections, are, that the blast cannot in practice be raised to more than 800° to 900° Fah., and that at this temperature pipes soon burn out, expansion and contraction will open joints, causing an appreciable loss of blast, and necessitating an increased consumption of gas or fuel; and, moreover, stoppages for repairs, rebuilding and cleaning out are so numerous and frequent as to make a very large item in the allowance in cost for "contingencies," and to frequently materially add to the cost of iron produced. Until within comparatively few years abroad, and, in practice, in this country until the present summer, such has been the situation of the hot blast system, and its advantages theoretically have been in practice greatly diminished by the difficulties arising from destruction of pipes, repairs to ovens, cleaning, explosions and kindred disasters.

Previous, however, to Neilson's invention, in 1828, the principle upon which the greater portion of our metallurgical industry is destined to be conducted was laid down by Robert Stirling, who, in 1817, patented a system of heating air, gases, or fluids by the agency of air, gases or fluids, by means of passages formed of brick, metal, stone, or any suitable material readapted to the degree of heat required." This was the foundation of the regenerative principle, and the basis on which all systems of fire brick stoves for heating are placed. But Stirling simply demonstrated the application of his system to the manufac-

ture of bricks or lumps in the regenerators afforded space for the deposit of this dust, which speedily stopped up the open work and impeded the currents. This necessitated the use of a purifier, in the arrangement and construction of which great expense has been incurred, and which still required frequent stoppage for cleaning, whereby loss was incurred. No method of cleaning this out from the outside is supplied, and an additional fault is that the gas is not forced to pass over the whole heating surface. To overcome the obstacles presented in the Siemens-Cowper system, and yet to utilize the excellent principle

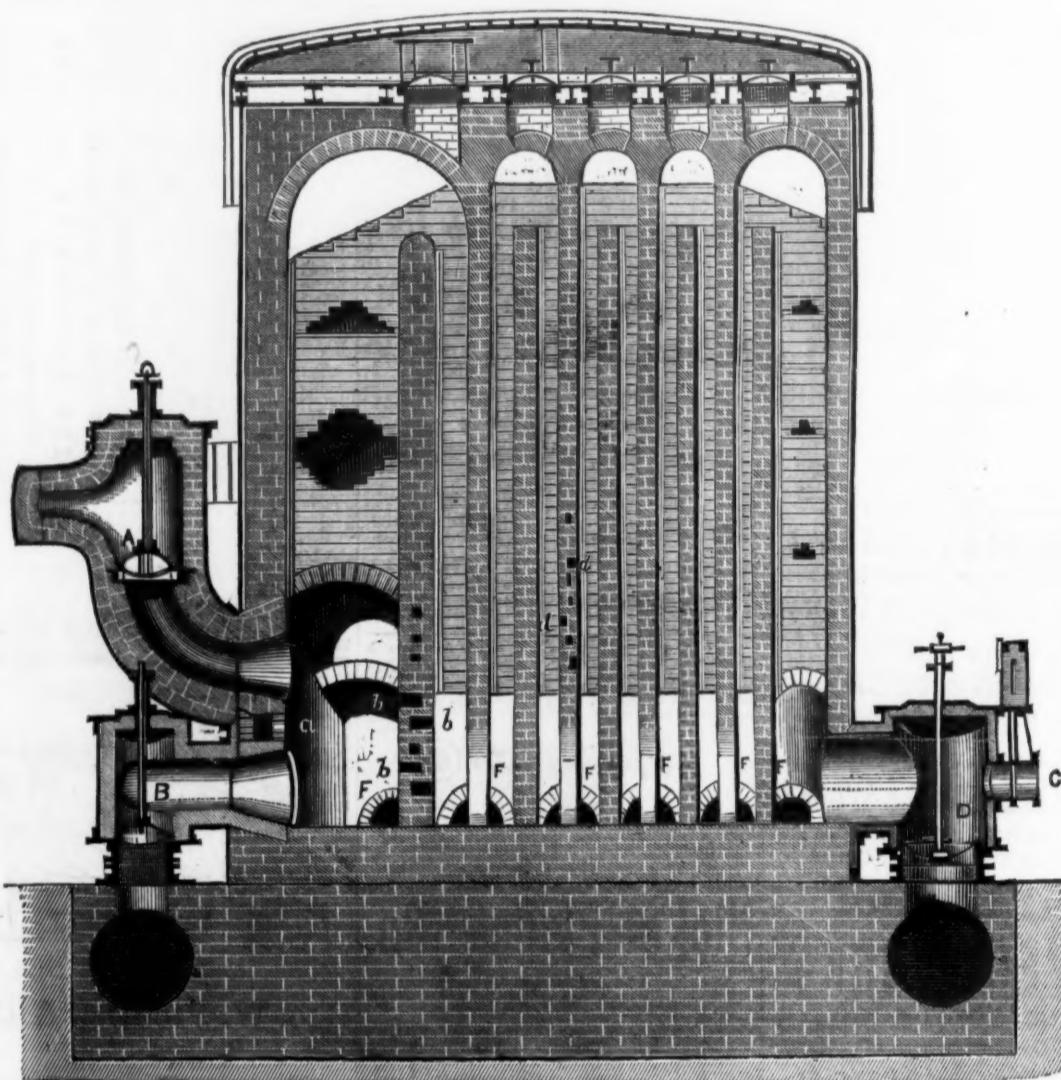
substituted solid brickwork, the first stoves which were erected at the Thornaby Iron Works being rectangular, which form was speedily altered to circular. The formation of the stoves are extremely simple, and they are worked in pairs, one being heated by the gas while the other is heating the blast, and vice versa. The stove is then simply of a circular, upright form, in largest size 28 feet high and 22 feet diameter, surrounded by an air-tight shell of boiler plate, divided interiorly by nine parallel walls so placed that the gas is burnt where it enters, and the whole of the products of combustion are led over one wall and under the rest until they

As economy is of the first importance, the results obtained by these stoves are noted. When first introduced at Consett Works, England, the weekly product was 350 tons iron, with a consumption of 24½ cwt. of coke to the ton, with a 44 per cent. ore. The use of the Whitwell stove increased this yield to 500 tons iron per week, with a reduction in the fuel to 20 cwt. per ton of iron. This result was so clearly a step of important progress in the practice of hot blasts that the stoves were speedily adopted in England, Wales and very generally on the Continent, where something over 200 of them are now in use. The average product with one stove is 100 tons pig per week, the average temperature being 1400° by the electrical pyrometer, and the following data are interesting, as supplied from results in actual working, viz.: Diameter, 22 feet; height, 28 feet; quantity of air heated per minute from the temperature of 60° Fahr., and ordinary pressure of atmosphere, 1200 cubic feet; temperature to which above air was raised, 1430° Fahr.; volume of above air when heated as above, 4387 cubic feet; speed of blast through oven per minute, 328 feet; total heating surface in each oven, 9000 superficial feet; product of iron (four stoves) 44 per cent. ore, 500 tons per week; coke per ton of iron produced, 17 cwt.; charcoal per ton of iron, 32 per cent. ore, 20 cwt.

The distinguishing advantages claimed for these stoves are: 1. Ability to stand 2000° heat without damage. 2. No cast iron pipes to wear out. 3. Facility of cleaning while hot. 4. Economy of gas and fuel and utilization of entire heat given off by such gas or fuel. 5. No greater cost, in proportion to result obtained, than ordinary cast iron plant. 6. An economy of several cwt. of fuel to ton of iron. 7. No leakage, and hence less wear and tear on blowing engines. 8. No loss by friction—a pressure of four pounds at the engine house giving an equal pressure at the tuyere. 9. Regularity of temperature, producing the best effect in working the furnace.

In the United States the Whitwell fire brick stove has been adopted by the Cedar Point Iron Co., Lake Champlain, N. Y.; Aetna Iron Co., Ironton, Ohio; Meier Iron Co., Missouri; Rising Fawn Iron Co., Dade county, Ga.; and others now in construction. The Rising Fawn Furnace has been first to blow in with this stove in the United States, although the Cedar Point Furnace is completed and the others nearly so. The results obtained at Rising Fawn Furnace from American ores and in an American plant are useful as data for subsequent production. The furnace is 16x60 feet, 12 feet high, 6 feet 6 inches hearth, and with boshes of an angle of 73°. There are three Whitwell stoves, 30 feet high, 18 feet diameter with 8000 superficial feet of heating surface in each. The ores are fossiliferous and represent about 44 per cent. iron; the fuel, coke from the Great Warrior coal made in Belgian ovens. The furnace was lighted June 16th, on the 18th blast was put on, and on evening of same day the stoves were working, increasing temperature at tuyeres from 150° to 300° Fah. Two hours later 450°, and at 11 p. m., or in 5 hours, to 600°, melting lead at the tuyeres. On 4 p. m. on the 19th, 27 hours after blast, 15 tons of white iron were cast. On the 21st the furnace made 1 cast of mottled, 2 of gray forge and No. 2 X. The iron is strong with little tendency to cold-shortness. At the time the engineer in charge of the stoves, Mr. Wm. M. Brown, who is Mr. Whitwell's American representative, and to whom we are indebted for these notes, left the works, the furnace was making iron on 2400 coke to 4600 ore. No limestone or other flux being used, owing to lime in ore and slate in coke, the charge was as follows: One part of ore representing 44 per cent. iron, 13 per cent. lime, 2 per cent. alumina, and 10 per cent. silica, so that 46,000 lbs. of ore were 20,240 lbs. iron, 5080 lbs. lime, 4000 lbs. alumina and 1380 lbs. silica. The fuel charge was represented by 17,880 lbs. carbon or perfect coke, 3048 lbs. silica, 1680 lbs. alumina and 480 lbs. lime, which gives for the furnace charge: 20,240 lbs. iron; 17,880 lbs. coke, perfect; 7648 lbs. silica; 6460 lbs. lime; 3060 lbs. alumina. This would represent 17-17 cwt. of coke, perfect, to the ton of iron, or 18-03 cwt. of Connellsville coke to the ton. These results are sufficiently striking to speak for themselves, and to bear out the general statement of the patentee that with these stoves one ton of fuel will make one ton of iron. The results with anthracite will be looked forward to with interest as well as with confidence in their success.

**Vacuum Relief Valve for Water Pipes.**  
Philip Hinkle, San Francisco, Cal., has invented a novel relief valve for water pipes, by which he is enabled to prevent the heavy jar caused by the sudden shutting off of running water in pipes, where a vacuum is produced by its running. The invention consists of an inwardly opening valve, suitably attached, which is kept closed by a light spring and the pressure of water inside the pipe. When this latter pressure is removed by the vacuum caused by the flow of water, the pressure of air outside of the valve will open it and allow air to enter and relieve any jar.

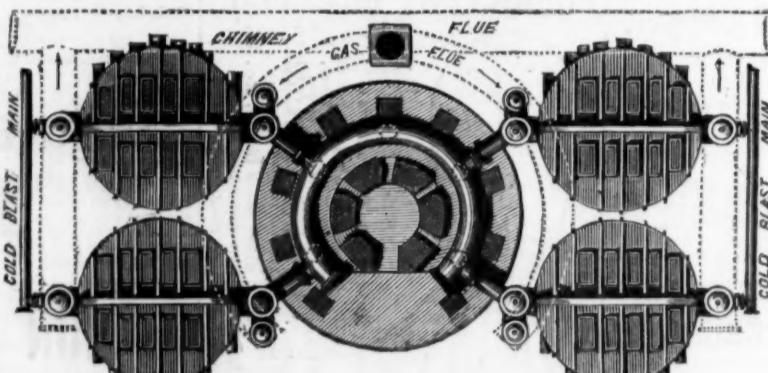


THE WHITWELL HOT BLAST STOVE—VERTICAL SECTION.

ture of glass and pottery. This principle lay dormant until 1856, when Siemens patented the great improvement in furnaces which bears his name. Here is passed through chambers containing refractory materials, generally fire brick loosely stacked, and air to support combustion in the furnace is passed through the same chamber in the

embodied in it, was the problem of the hot blast at this time. This was successfully solved by Thomas Whitwell, of Stockton-on-Tees, England, for many years a practical iron master, and who visited the United States during the fall and winter of 1874, and was, in company with Isaac Lowthian Bell, the honored guest

enter the chimney flue, being then little above 212° Fah. After a few hours heating the currents are reversed, and the blast takes up the heat received from the products of combustion, and passes into the tuyere at a bright red heat. As the direction of the blast is inverse to that of the gas, the cool air enters the stove at its



GROUND PLAN OF THE WHITWELL HOT BLAST AT CONSETT, ENGLAND.

of the American iron masters. The Whitwell fire brick stove, from its inception, has been thoroughly successful. On the Continent and in Great Britain its use has been very rapidly adopted, while in the United States it has been applied to several furnaces, but as yet put in practice at but one, and that within a few weeks, but with such results as to afford entire satisfaction. As the latest and most successful hot blast apparatus, and as the system most practical in economizing fuel, while at the same time greatly increasing the product, it bids fair to be generally adopted. This stove embodies Stirling's original principle of 1817, as applied to the heating of the furnace blast, and in no way resembles Cowper's or Siemens' application of the regenerative principle. The construction of this stove abandoned the skeleton walls and

and hot blast are cooled by water, so that they are faced air-tight, and have been in some cases safely exposed to a temperature of 3000° Fah., and where in use for nine years, as at the Consett Iron Works, England, no one of 64 valves has failed. The cleaning of the stove is extremely simple, being done while red-hot, and only causing a delay of the stove being cleaned for an hour; but no stoppage to the furnace. This cleaning is required only five or six times per annum. The durability of these stoves is their great feature next to their economy of fuel. The first stove erected, some nine years, since have never been stopped for repairs, and after careful calculation the constructor considers them certain to run ten years without repair, and that not to exceed \$500, after which they will be good for ten years more.

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<b>A. R. Whitney &amp; Bro.,</b> Manufacturers of and Dealers in <b>IRON,</b> 56, 58 & 60 Hudson, 48, 50 & 52 Thomas, and } NEW YORK. 12, 14 & 16 Worth Sts., Our specialty is in Manufacturing Iron Used in the Construction of <b>Fire-Proof Buildings, Bridges, &amp;c.</b> AGENCY OF Abbott Iron Co., Boiler Plate & Tank Iron. Glasgow Tube Works Boiler Flues. Pencoyd Iron Works Shatting. Pencoyd Iron Works Shatting and Tires. A. Whitney & Bro.'s Rivets. Whitney's Best Bar Iron. Passaic Rolling Mill Wrought Iron Beams and Plates. Paxton Rolling Mills. Books containing cuts of all Iron now made, and sample pieces at office. Please address 58 Hudson Street.	<b>AMERICAN</b> <b>Galvanized Sheet Iron,</b> AND AGENT FOR THE Easton Sheet Iron Works, Easton Pa. MANUFACTURER OF Best Bloom, Charcoal & Refined Sheet Iron. Galvanized Telegraph and Fence Wire Galvanized and Tinned Roofing and Siding Nails. Galvanized Hoop Iron of all widths. Galvanized Staples. Corrugated Iron for Roofing, plain or gal'd. Galvanized Bars and Chains for Cemetery Railing. Tin Plates, Spelter, and other Metals.	<b>SCRAP IRON,</b> <b>Pig Iron,</b> <b>OLD METALS.</b> YARDS: 88 to 104 Mangin St., Foot of Stanton St., E. R., 71 to 79 Tompkins St., New York. OFFICES: 90 & 92 Mangin St., New York, 178 Pearl Street, 30 The Albany, Liverpool, England.	<b>B. F. JUDSON,</b> Importer of and Dealer in <b>SCOTCH AND AMERICAN</b> <b>Pig Iron,</b> Wrought & Cast Scrap Iron, English and American <b>HORSE SHOE IRON, &amp;c.,</b> 457 & 459 Water St., and 233 South St., NEW YORK.	<b>Burden Iron Works, H. Burden &amp; Sons</b> Troy, N. Y. <b>Pottsville Spike, Bolt and</b> <b>Nut Works.</b> G. D. ROSEBERRY, Pottsville, Pa. Manufacturer of <b>RAILROAD SPIKES</b> <b>MINING SPIKES,</b> Cold Pressed Nuts, Machine Bolts & Bolt Ends.
<b>BORDEN &amp; LOVELL,</b> Commission Merchants 70 & 71 West St., Wm. Borden, L. N. Lovell, — New York. Agents for the sale of <b>Fall River Iron Co.'s Nails,</b> Bands, Hoops & Rods, AND <b>Borden Mining Company's</b> Cumberland Coals.	<b>NORWAY IRON WORKS.</b> Spring, Tire, Toe Calk & Sleigh Shoe Steel. <b>BLISTER STEEL,</b> <b>SCRAP RODS,</b> 3-16, 1-4 and 5-16 Round and Square. <b>Norway Shapes &amp; Nail Rods,</b> Etc., Etc. Address, <b>NAYLOR &amp; CO.</b> New York, Boston or Philadelphia.	<b>REYNOLDS &amp; CO.,</b> 145 EAST STREET, NEW HAVEN, CT., Manufacturer Iron and Steel Set Screws, Round, Square and Hexagon Head; Machine and Cap Screws; Piano, Knob and Lock Screws; Machine, Bridge and Roof Bolts, Bolt Ends, Bolts, Nuts, Washers, etc., of every descriptive Send for Price List.	<b>PETER P. PARROTT,</b> Manufacturer of the <b>"CLOVE"</b> <b>ANTHRACITE PIG</b> <b>IRON.</b> At Greenwood Iron Works, ORANGE CO. N. Y.	<b>COLEMAN &amp; BRO.</b> Manufacturers' Agents and Brokers <b>PIG IRON, NAILS, RAILS, NUTS,</b> <b>WASHERS, and General</b> Railroad Supplies. LOUISVILLE, KY.
<b>WILLIAM H. WALLACE &amp; CO.,</b> <b>IRON MERCHANTS</b> Cor. Albany & Washington Sts., NEW YORK CITY. Wm. H. WALLACE.	<b>P. W. GALLAUDET.</b> Bunker and Note Broker, Nos. 3 and 5 Wall Street, NEW YORK. HARDWARE, METAL, IRON, RUBBER, SHOE, PAPER AND PAPER-HANGINGS, LUMBER, COAL AND RAILROAD PAPER WANTED. ADVANCES MADE ON BUSINESS PAPER AND OTHER SECURITIES.	<b>HOLDEN &amp; STOKES,</b> CAST STEEL, RAILS, & R.R. SPIKES. 104-106 JOHN ST. NEW YORK.	<b>Phoenix Brass &amp; Iron Foundry</b> EDWARD GOUGH, Allentown, Pa., Manufacturer of Soft & Hard Chil Roll, Sand Roll & Pinions. Hard Chil Roll are guaranteed to be uniform and made to any depth of chil, to suit. The only manufacturers of Soft Chil Roll in the United States.	<b>PACKARD, GOFF &amp; CO.</b> Youngstown, O. Manufacturers of <b>Merchant Bar Iron.</b> Mills at Hubbard, O.; also Jobbers in Nails, Nuts, Washers & Carriage Belts.

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The Company possesses inexhaustible mines of Coal and Ore, of suitable varieties for the production of Iron and Steel rails of

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Their location, coupled with every known improvement in machinery and process of manufacture, enable them to offer rails, when quality is considered, at lowest market rates.

The long experience of the present Managers, of the Company, and the enviable reputation they have established for "CAMBRIA RAILS," are deemed a sufficient guarantee that purchasers can, at all times depend upon receiving rails unsurpassed for strength and wear by any others of American or foreign make. Any of the usual patterns of rails can be supplied on short notice, and new patterns of desirable weight or design will be made to order. Address,

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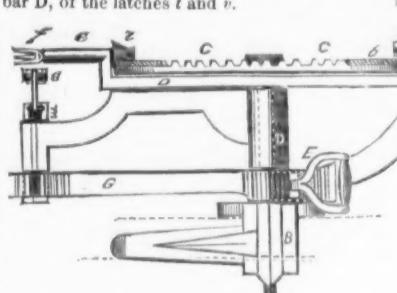
## New Patents.

We take from the records of the Patent Office in Washington the following specifications of certain patents lately issued, which will be found interesting:

## APPLE PAPER.

To E. L. Schenck, Pleasant Mount, Mo.—1. The combination of the wheel C, having cogged semi-circle b, the bar D, with tubular bearings e, fork f, and pinions i.

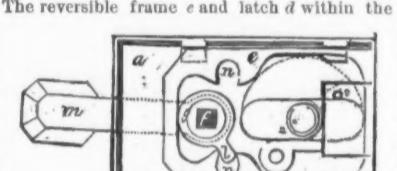
2. The combination, with the wheel C and bar D, of the latches t and v.



3. The cogged slide G, operated by lever E and segment h, in combination with the segment k and vertical shaft m, provided with knife paring lever L.

## REVERSIBLE LATCH.

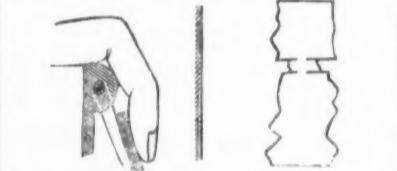
To Elisha C. Hussey, Rutherford Park, N. J.—The reversible frame e and latch d within the



case, and the arm l, spindle f, and weighted handle m, constructed and arranged as specified, so that the arm l enters the notch n in the lower part of the frame e, and acts to project or retract the latch by a direct movement.

## MORTISE LOCK FOR SLIDING DOORS.

To B. Mallory, New Haven, Conn.—In combination with the face plate of a lock or pull



for sliding doors, constructed with a finger opening and recess in rear of said plate, a self-closing flap for said opening.

## SAW BUCK.

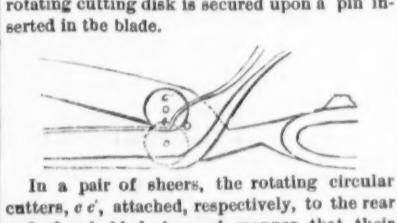
To R. C. Hayton and Chas. A. Hurlburt, Ypsilanti, Mich.—The saw buck is formed of sec-



tions of metal tubing, which are secured in place by two hollow metal crosses, forming sockets for the reception of the ends of the sections, and a foot brace of the same attached to the legs of the buck by a T shaped socket joint. The combination of the cross A, arms B, T joints C, and foot brace D.

## TAILORS' SHEARS.

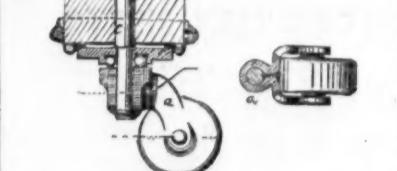
To Maurice E. Pleas, North Manchester, Ind.—At the rear end of each blade a circular rotating cutting disk is secured upon a pin inserted in the blade.



In a pair of shears, the rotating circular cutters, c c', attached, respectively, to the rear end of each blade in such manner that their exposed surfaces shall be on a line with the inner sides of the blades.

## FURNITURE CASTERS.

To Cedeva B. Sheldon, New York, N. Y.—Forming a rolled up eye for the swivel pin of the caster, the whole struck up from a single

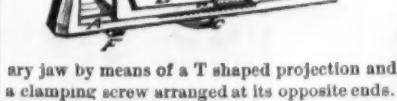


piece of sheet metal in such manner as to cheapen construction.

The improved one piece sheet metal horn a, having the rolled up eye a'.

## WRENCH.

To Isaac W. Heyninger, Philadelphia, Pa.—The moveable jaw is connected to the station-



ary jaw by means of a T shaped projection and a clamping screw arranged at its opposite ends.

1. The combination of the slotted toothed

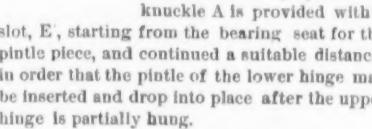
bar A, the movable toothed bar B, provided with the button F, and lug H, and the clamping screw C.

2. The clamping screw C, passing through a slot in the main bar A, into the lug H, and the rear portion of the movable bar B.

## HINGE.

To Samuel T. Davis, Washington, D. C.—1. The combination of the wheel C, having cogged semi-circle b, the bar D, with tubular bearings e, fork f, and pinions i.

2. The combination, with the wheel C and bar D, of the latches t and v.



3. The cogged slide G, operated by lever E, starting from the bearing seat for the pintle piece, and continued a suitable distance, in order that the pintle of the lower hinge may be inserted and drop into place after the upper hinge is partially hung.

4. A loose joint hinge in which the eye-piece or knuckle A is provided with a slot, E, starting from the bearing seat for the pintle piece, and continued a suitable distance, in order that the pintle of the lower hinge may be inserted and drop into place after the upper hinge is partially hung.

## FURNITURE CASTERS.

To Cedeva B. Sheldon, New York, N. Y.—A hard metal washer is interposed near the top of a stamped or struck up spindle socket, the spindle passing through the washer and riveted above, the object being to give solidity and bear the weight without wearing away the soft

metal. There may also be a shoulder for the washer formed in the socket by a contraction of the upper ends thereof, the spindle in each case passing entirely through and riveted above.

1. The combination, with spindle and spindle shaft, of bush or washer C, secured in the socket by the spindle end passing through the same, and riveted above.

2. The shoulder for washer or wearing bush, formed in the socket by a contraction, F, at the upper end thereof, the spindle passing through and riveted above the socket.

## LOCK HINGE.

To John Aikman, Norwich Township, Oxford county, Canada.—A detachable lever or latch interposed between the two parts of a shutter hinge, one end passing over and working upon the pintle of the hinge, while the other projects through the shutter or door, engaging with a

holder or catch on the inside, and likewise serving as a lifting device. There is also a slot in the lower part of the hinge, and a shoulder, so arranged that the lever or latch drops into the slot, and presses against the shoulder, to fasten the hinge when the shutter or door is wide open.

1. The detachable lever or latch F, working in the hinge on the pivot or pintle E, and fitting through the stile of the blind B, in combination with the holder or catch I on the window frame, substantially as shown and described.

2. The slot H in the lower part of the hinge C, in combination with the detachable lever or latch F and the shoulder G, all operating together substantially as and for the purposes above set forth.

## BED PULL.

To Stephen D. Arnold, New Britain, Conn.—The inner end of the lever may be cut off to adapt the device to doors of different thickness.

The lever bell pull f, pivoted to the plate r, and provided with two or more wards, i i, in combination with the bridle e, lever d, hammer l and bell a.

## DROP HAMMER.

To F. A. Pratt, Hartford, Conn.—The roller is carried in a rocking frame, and is caused to approach toward and rec

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For each additional constituent of usual occurrence..... 1.50

For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.

For determining the per cent. of Sulphur and Phosphorus in Iron or Steel..... 14.00

For each additional constituent of usual occurrence..... 6.00

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For all other constituents..... 2.00

For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50

or determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charge will correspond with those for the constituents of an ore.

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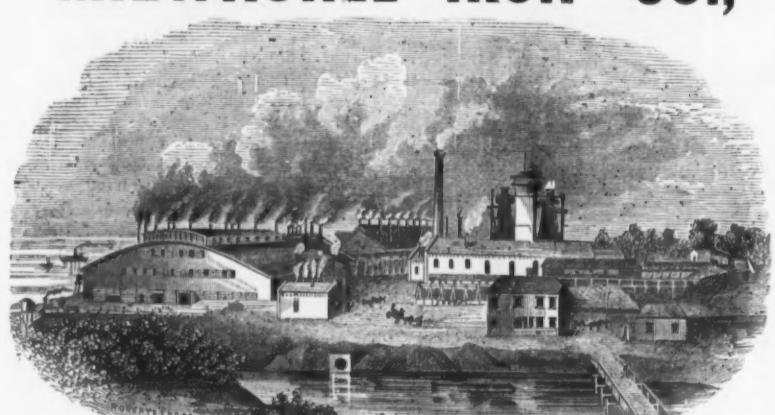
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It is a simple machine to use that double seams and sets down without changing the work. Its peculiarities are its

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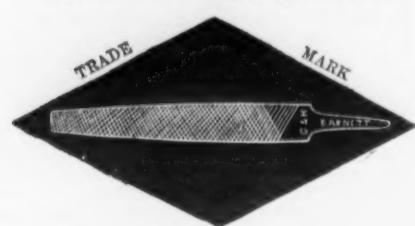
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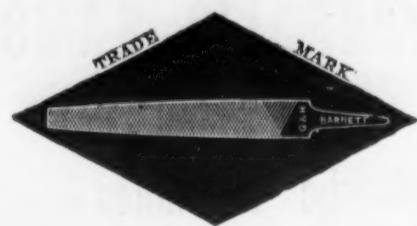
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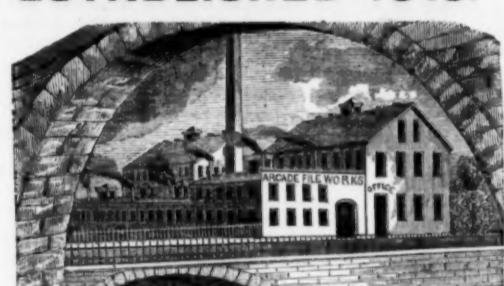
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Store Door Locks, Night Latches,  
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SMALL, FLAT, AMERICAN STERLING METAL KEYS,

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A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, they will rival the best made Locks in finish and perfect operation.

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having thirty-five finely divided Brass Tumblers in each Door, and twenty-eight in each Drawer Lock, each one being finely filed notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.

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Patented June 28th, 1870.  
The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webb, marked "No. 40, Harvey W. Peace."  
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Sole Proprietor & Manufacturer,  
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**AMERICAN SAW CO.,**  
Manufacturers of

**Movable Toothing Circular Saws,  
PERFORATED CROSS-CUT SAWS  
And SOLID SAWS of all kinds.**  
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**THE SILVER STEEL  
DIAMOND CROSS-CUT SAW.**  
\$1.50 Per Foot. Patent Secured  
CRUCIBLE THE CLEARS

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of SPEED AND  
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SOLE MANUFACTURERS FOR THE UNITED STATES.  
So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE  
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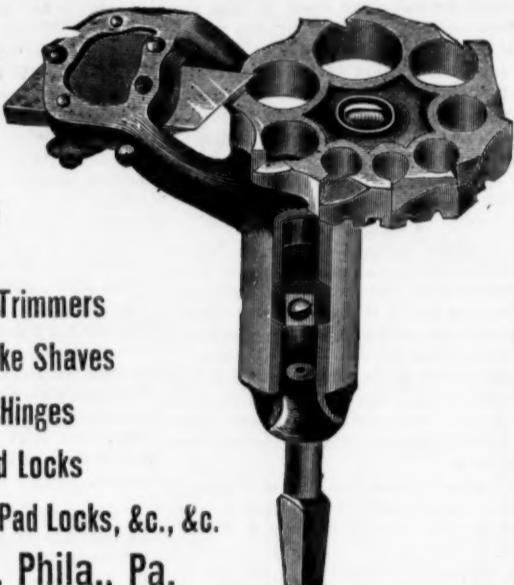
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No oil or attention required. Runs with little or no wear. No dirt or danger from fire. No damage to goods in process of manufacture. Years in use by best concerns, who are refitting old, and ordering new machinery to be metalined.

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Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old V, outlined on M tooth.

TELEGRAM DATED Oct. 1st, 1874.

STATE FAIR, EASTON, PA.  
TO HENRY DISSTON & SONS: Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his Saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Eastern Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

**J. FLINT,**  
Manufacturer of  
**ALL KINDS OF  
SAWS**  
And Plastering Trowels,  
ROCHESTER, N. Y.

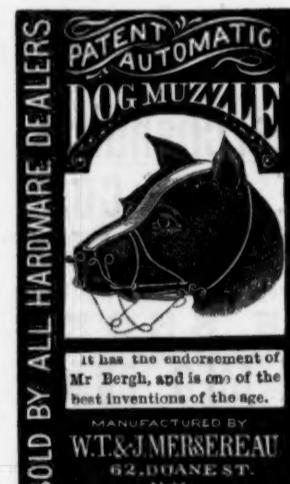
A large Stock of Cross Cut Saws constantly on hand. Orders filled promptly. **Dietrich's Double Handled Cross Cut Saw** made in every kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for Illustrated Price List.

**Rogers' Self-Sharpening  
HOE.**

The best Hoe in market. It will not batter or break. Wears itself sharp. Will last twice as long as any other Hoe, and is warranted to cut the "Boiles Hoe" or any Hoe in market.

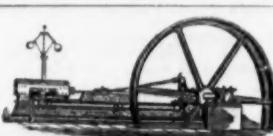
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RUSSELL & ERWIN MFG. CO., - - - New York.  
BYRNE & FITZSIMONS, - - - Albany, N. Y.  
KENNEDY, SPAULDING & CO., - - - Syracuse, N. Y.



**HARRIS & WESTON,  
Nickel Platers**  
182 CENTRE STREET,  
Corner Hester,  
NEW YORK.  
Fourth Avenue cars pass the door.

We guarantee our Nickel not to Strip or Peel.



**The Hartford Foundry & Machine Co**

Successors to the

**HARTFORD, CONN.**  
J. S. Hunter, Pres't. E. J. Murphy, Treas. & Sec.  
High and Low Pressure Marine & Stationary  
STEAM ENGINES AND BOILERS,  
Mining, Powder & Paper Mill Machinery,  
And every variety of Iron and Composition Castings  
made to order.

The following are a portion of the Engines manufactured at these works, and are a sufficient guarantee of our power for doing first-class work, viz., Marine & Stationary Engines in the cities of Brooklyn, N. Y.; St. Louis Mo. and Hartford, Conn., and in the Charlestown, Mass. and Norfolk, Va. Navy Yards, and the engines in the U. S. S. "Saratoga," "Wabash," "Mississippi," "Minnesota" and "Pocatello" and the Gun Boats "Cayuga," "Pequot" and "Nepic," the Government Transports "Dudley Buck" and "Geo. C. Collins," and the Steamships "America" and "United States." Also the large Horizontal Engine for the new Plate Mill of the Bay State Iron Co.

**WHEELER, MADDEN  
&  
CLEMSON,**  
Manufacturers of Warranted Cast Steel

**SAWS**

of every description,  
including

Circular, Shingle, Cross Cut,  
Mill, Hand, Roberts' and  
other Wood Saws,  
&c., &c.

**Cast Steel Files**

of the well known brand of

**Wheeler, Madden & Clemson.**

FACTORIES:  
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**BRUNDAGE FORGED HORSE NAILS,**

Manufactured from  
**BEST NORWAY IRON,**  
by BRUNDAGE & CO. Sold by  
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make a specialty of the LARGEST SIZES of  
Circular Saws, and call particular attention of lumber  
manufacturers to the following points of excellence:  
1. **Patent**—Tensioned by a power screw, strained  
my furnace, subjects all parts of the saw to a DEAD  
heat, and when dipped in the oil bath secures perfect  
uniformity.  
2. **Accuracy**—In Thickening—My  
saws are ground on a patent machine, automatic in its  
operation, grinding off the thick places upon the  
plate before the thinner parts are reached, and when  
the saw is removed BALANCES PERFECTLY, which  
is proof positive of the right accomplishment of the  
work.

**Properly Hammered.**—Great care is taken  
no stone left in work without due attention  
in this important particular, as a saw thus  
strained upon the rim, or too loose in the center,  
cannot be successfully run—hence the importance  
of so hammering the saw as to effect equal strain  
in all parts, and at the same time, not strain the  
saw. This department is under the personal supervision of  
myself, who has devoted over twenty years to the art  
of saw making.

I am the proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

**JAMES OHLEN.**

**V. G. HUNDLEY,** Agent,  
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**NORTH CAROLINA HANDLE CO.,**  
(Wilson & Shober, Props.)  
Manufacturers of  
AXE, PICK, GERMAN & AMERICAN  
SLEDGE, and other Handles.  
Full assortment always on hand.

**J. CLARK WILSON & CO.,**  
P. O. Box 2355.  
81 Beekman St., New York.

The Axe for the Season of 1875 and '76.

**H. CLARK'S CAST STEEL AXES.**

Every Axe fully Warranted.

**Western Beveled.**

**Kentucky.**

**Rockaway Pattern.**

**Long Island.**

**BRONZED OR RED.**

Price Per dozen..... \$11.00 net cash.

Beveled Axes.....

50c per dozen extra.

Send a Sample ORDER.

**VAN WART, SON & CO.**

Hardware Commission Merchants,

BIRMINGHAM, - ENGLAND,

Agents,

**VAN WART & McCOY,**

184 & 186 Duane Street, N. Y.

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48 India Street, Boston.

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Himmer & Son's Celebrated Harness and other Needles.

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Seydel's "Ashantee" Pocket Hammock

**OSCAR IRVING VAN WART & CO.,**

FORWARDING AGENTS.

2 South John Street, LIVERPOOL.

Send for latest Price Lists to

C. W. LE COUNT,

South Norwalk, Conn.

**JOHN MAXHEIMER,**

Patented,

June 3, 1862; April 6, 1869;

Dec. 23, 1872; Jan. 20,

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Manufacturer of

— FULL SIZE OF —

UNION CONNECTION

JAPANNED and

PATENT EUREKA

Bright Metal

**BIRD CAGES.**

Nos. 247 & 249 Pearl Street

NEW YORK.

Send for latest Price Lists to

H. C. CARTER,

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Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTER'S PATENT CARRIAGE LIFTING JACK, &c.

**Moulders' and Plasterers' Tools.**

## Cutlery.

## John Russell Cutlery Co.,

FACTORIES AND OFFICE,

TURNERS FALLS, MASS.

Manufacturers of

TABLE CUTLERY,  
Butcher, Painters' and Druggists' Knives

IN GREAT VARIETY

Extra Hard Rubber Handle Table Cutlery of our own Manufacture.  
Fine Ivoride Handle Table Cutlery, very White and Durable.

Sample Office, 77 Chambers St., N. Y.

## NORTHAMPTON CUTLERY CO.,

Manufacturers of all kinds

## American Table Cutlery,

Cook, Butcher, Shoe and Hunting Knives. Sole Agents for Rogers' Cutlery Co.

Plated Forks and Spoons.

THEODORE WEED, Manager. 45 Murray Street, N. Y.

## FRIEDMANN &amp; LAUTERJUNG,

MANUFACTURERS OF

Pen and Pocket Cutlery, Solid Steel Scissors, F. & L. Shears, Razors,  
Russia Leather Straps, Oil and Water Hones, &c.

Sole Proprietors of the renowned full concaved patent

## "ELECTRIC RAZORS."

Also Agents for the BENCALL RAZORS.

American Table Cutlery, Butcher Knives, &c.  
14 Warren Street, NEW YORK. 423 N. Fifth Street, ST. LOUIS, MO.TABLE KNIVES AND FORKS OF ALL KINDS,  
AND EXCLUSIVE MAKERS OF

And the "Patent Ivory" or Celluloid Knife. These Handles never get loose, are not affected by hot water, and are the most durable knives known. Always call for the Trade Mark "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

## THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of

## PATENT FINE PEN &amp; POCKET CUTLERY

WEST MERIDEN, CONN.

The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the Best American Knife. We also make

## NICKEL &amp; SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by Messrs. J. Clark Wilson &amp; Co., No. 81 Becken Street (who have a full stock of all patterns always on hand), and also by Messrs. G. B. Walbridge &amp; Co., No. 99 Chambers Street.

## Naugatuck Cutlery Co.,

Manufacturers of FINE

## PEN and POCKET CUTLERY.

FULLER BROTHERS, Sole Agents,

89 Chambers and  
71 Beale Sts., N. Y.

## HAMMER &amp; CO.,

Branford, Conn.

Manufacturers of the following Patented Articles of

## MALLEABLE IRON:

Hammer's Adjustable Clamps,  
Hammer's Malleable Iron Oilers,  
Hammer's Mail, Iron Hand Lamps,  
Hammer's M. I. Hanging Lamps,  
For Sale by all the principal Hardware Dealers.Malleable Iron Castings  
Of Superior Quality made to order.

ESTABLISHED 1852.

## NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

## Table &amp; Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST  
MATERIAL.

## WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.

AMERICAN  
PEN AND POCKET KNIVES,

MANUFACTURED BY

PEPPERELL,

MASSACHUSETTS

My Blades are forged from the best Cast Steel, and

To me was awarded the GOLD MEDAL

of the Connecticut State Agricultural Society; also Medals

and Diplomas from the Mass. Mechanics' Assn. Sept. 1860.

Stretches the wire each way, is  
tightened with a common wrench  
in self-fastening at each half turn  
of the spiral wire, giving great  
strength and durability.  
W. H. WARD & CO.,  
Manufacturers of  
Malleable Iron,  
Rochelle, Illinois.Agents: Hubbard & Spencer, Chicago; Excelsior  
Mfg. Co., St. Louis; John Nazro & Co., Milwaukee;  
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NEWARK, N. J.Manufacturers of Patent Brass Pad Locks for  
Railroads and Switches. Also, Patent Stationary  
R. R. Car Door Locks. Patent Plan  
and Sewing Machine Locks.

141 to 145 Railroad Avenue, NEWARK, N. J.

Illustrated Catalogues sent on application.

## Cutlery.

## PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, July 19, 1875.

It seems at last to be generally admitted that we are to have a really good fall trade in all departments, in which iron and its industries will share fully. Hence, everyone who can is snatching the opportunity to get a brief holiday before business revives. The week has been enlivened by some spicy testimony in the Reading Railroad Company investigation matter, and by Centennial matters, which are extremely active just now. In the Reading Railroad matter, which is an investigation by a legislative committee of certain charges against the P. &amp; R. R. Co., of having engaged in business unlawful under its charter, to wit, the formation of the Coal and Iron Company, and the retailing of coal, the defence, as conducted by the president, Franklin B. Gowen, Esq., has brought out some facts which are of great interest to the public, and damaging to the enemies of the company. The parties who instituted these charges are understood to be the coal shippers at Port Richmond, and the Retail Coal Dealers Association. In the testimony for the prosecution, it was claimed that the weights of coal, as furnished by the Coal and Iron Co., were very generally short, and that unfair discrimination was made against the retailers in the matter of deliveries of coal cars. In the defence, Mr. Gowen sets out with stating that the amount of the charges is due first, to the fact that the Reading Coal and Iron Co., has, to a great extent, superseded the business of the coal shippers by doing the same work at a cost of 10 cents a ton for which they charged 30 cents; and by a better and speedier distribution to Eastern ports by use of steam colliers. In the matter of complaint from the retailers, he demonstrates that the company has furnished a better coal at a cost of \$1 per ton less direct to consumers. In the charge of short weights, he shows, by undeniable evidence, that the total shortage, all of which was allowed for on settlements, only amounted to 21 tons out of 12,000,000 tons annually. But the astute lawyer, who is president of both companies, went further than this. He attacked the retailers on their most tender point, and one in which he was sure to have the sympathy of the public with him if he substantiated his charges, as he has since done. He claimed that the parties complaining of his company were systematically cheating their customers by short weight on single ton deliveries. To prove this he had coal purchased in small quantities from these parties on 21 different occasions, and then weighed by a government weighmaster. In almost every case the amount fell short materially; in one case the shortage being 527 lbs. out of 2240 lbs., or nearly one-fourth of a ton; in another 427 lbs., with an average of at least 200 lbs. in all, or nearly so. At \$6 a ton the overcharge thus made was on some of that coal equal to \$1.88 per ton; the average overcharge was 61 cents per ton, while on the lowest, and which were evidently intended to be honest, it was nominal, or merely one cent per ton. But at this ratio of underweights, as proven by the average cases, Mr. Gowen shows that in the retail consumption of this city, amounting to one million tons annually, the people are swindled yearly out of \$610,000, which they pay for coal they never get, and if the highest deficiency were taken as an index, the swindle would amount to a million and a half a year. A year or two since we had inspectors appointed to see that the legal ton of 2240 lbs. was in all cases delivered, and all coal carts were examined, measured and stamped. The office is evidently a sinecure, and Mr. Gowen in his raid on the dealers has ventilated a subject very close to the pockets of consumers here and elsewhere, and which it behoves all to examine into for themselves.

Some time since I related the facts in the case of the assignee of Morris vs. Ervin, being the Southwark Iron Foundry matter. Since the case has come up in court, and the answer of Ervin was materially the same as stated in his report to the press, and furnished in this correspondence. After argument, Judge Hale stated the difficulties in arriving at a conclusion, the case not having been set forth by the complainant as fully as it should have been, and if decided on plaintiff's evidence, as in a court of law, the decision would have been for the respondent. But, in equity, the case must be considered from the evidence of the respondent also, and it has been determined that what the respondent does not state tells as heavily against him as what he states does in his favor. The drawing out of the sum of \$100,000 was conceded, and respondent fails to show its meaning. The court was therefore compelled to conclude that this money came from transferring or disposing of any real estate or securities of which he was possessed, and the Seventh National Bank from paying him any money standing to his credit. Plaintiffs to give security in the sum of \$20,000, which, in addition to the \$261,000 real estate security already entered for the assignee, was immediately furnished. So closes the Morris-Ervin fiasco, and with it probably ends Mr. Alexander Ervin's connection with the iron trade, in which of late years he has been somewhat conspicuous.

Last week I alluded to a magnificent prospect to construct a pneumatic dispatch tube under the Atlantic, and prophesied that before it was done, and the Keeley motor in operation, the problem of navigating the air would be solved, and both the former schemes useless. I scarcely supposed the latter would be so near at hand, but the Baltimore American comes to my rescue with the identical inventor wanted at the proper moment, and settles that matter. A German gentleman, named Schroeder, formerly an officer in the British and American armies, and an aeronaut with La Mountain, has just patented the combination of balloon and mechanism which is to do the business. He has, further, interested capital in the person of Mr. Ax, of the tobacco firm of Galt &amp; Ax, to construct his aeronaut, and Postmaster Jewell is "highly gratified." It is curious how government officials "tumble" to all the new things which come up. The German ambassador has also taken plans and specifications with him to Europe to submit to the German government. The invention provides for a boat, in the form of a life boat, 60 feet long, 10 feet wide and 12 feet high, the frame of wire and steel, covered by waterproof linen. This vessel to be connected to and carried by a linen balloon capable of holding 70,000 cubic feet of gas. In the boat a 12 horse-power engine, which will drive the propellers, which are constructed as wind mills. Both propellers can be worked in one direction or one push and one pull. A gas machine will be attached to the balloon to supply the necessary gas for the voyage, and in case of a leak in the balloon other smaller ones filled with gas will be on hand, and when placed in the larger will stop the leak. Contracts are out for the

construction, and the machine to be ready August 5th, prox. Mr. Schroeder expects to voyage from Baltimore to New York (all roads lead to Rome) in an hour and a half, when wind is favorable. From New York to London he will go in 50 hours, and if he is trusted with postal matter to Europe, can complete the route from New York to Hamburg, Paris, Lisbon and Washington in six days, the round trip. The total weight of the airship will be 2800 pounds, and, in addition to a mail, 14 passengers can be carried. Fortunately, August 5th is not far off, and we can afford to wait for this machine, which, at least, possesses the elements of possibility, and does not claim to move the world in a teaspoonful of water.

As if we had no iron ore, Duluth comes now to the front with a new iron mountain, 8 miles long, half a mile wide and 1200 feet high. "If a square yard, therefore, will contain 2 tons of iron ore, we may compute this enormous mass at 1!"—but we will wait until we see it.

## The Time Lock at the Barre Bank.

To the Editor of the Iron Age.—DEAR SIR: In the issue of your paper for July 15th, giving to the public an illustration and description of a time lock, the writer of the article is evidently under a misapprehension which I will ask your courtesy to correct. Reference is made, in the article in question, to the recent attempt to rob the Barre National Bank, Vermont, and the writer seems to have supposed, and the implication is carried to the reader, that the lock which so successfully frustrated the attempted robbery was the lock which was the subject of the article. This is a mistake. The chronometer lock upon the vaults of the Barre Bank, at the time of the attempted burglary, was one of my own time locks—of my own invention, and covered by several patents granted to me, and was manufactured and placed upon these vaults by Sargent &amp; Greenleaf, of Rochester, N. Y.

I append a note received from the cashier of the bank in question, before the attempt to break into the vault was made, which sufficiently attests the correctness of my statement.

NATIONAL BANK OF BARRE,

BARRE, VT., May 13th 1875.

Messrs. Sargent and Greenleaf.—GENTLEMEN: I am instructed by our president to express to you the very good satisfaction your Double Chronometer Lock gives us. It adds greatly to the security of our valuables, and has been quite reliable in its working.

Yours, obediently, CHAS. A. KING, Cashier.

By inserting this you will oblige,

Yours, very respectfully, JAMES SARGENT,

of SARGENT &amp; GREENLEAF,

ROCHESTER, N. Y.

July 20, 1875.

In the article appearing in our issue of the 15th inst., to which reference is made, the dispatch describing the attempt to rob the Barre Bank was used merely as showing the utility of the time lock. The dispatch did not say by whom the lock in question was made, nor did we know anything more about it than that the efforts of the robbers to make the cashier the instrument of their crime were frustrated by the time lock which placed it beyond the power of that officer to open the vault, had he been willing to do so under threats or personal violence. There was no "implication" of any sort, nor did we know or care by whom the lock was made. The service rendered by it served our purpose by way of illustrating the utility of the principle embodied in all time locks for bank vaults.—Editor of The Iron Age.]

For more than a year past, says the Indianapolis Sentinel, Mr. Henry Stacy has been endeavoring to perfect plans by which coal tar, crude oils, &amp;c., could be practically utilized for the purpose of making heat enough to melt iron of all descriptions, brass, generate steam, &amp;c. One of these heaters was placed on a furnace at the Malleable Iron Works last week, where it required eight days and nights to anneal the iron with coal, but the heater did the work better in six days and nights, consuming but two and a half barrels of tar, costing \$1.50 per barrel. Mr. Stacy thinks he can run a locomotive a distance of 100 miles without a fireman at a cost of but 50 cents. The cost of each heater is not to exceed \$2 for each furnace. The tar, oil, &amp;c., passes from the barrel, tank or reservoir through a small pipe, and is deposited in front of a steam and cold air injector that forces it into the furnace in the form of spray, making a perfect mass of flame, but no smoke or sparks.

There are eight completed Bessemer steel establishments in the country, and every one of them is running to its full capacity and is full of orders. Two of these are at Chicago, one at Joliet and one at Newburg, near Cleveland. The new Edgar Thomson Bessemer Works, near Pittsburgh, a magnificent plant, will soon be in operation, and the Bessemer plant of the Lackawanna Iron and Coal Company, at Scranton, will also be completed this year. At St. Louis the Vulcan Iron Works are at work on a Bessemer plant, to be ready in 1876, making the eleventh in the country. It will be observed that, if we include Pittsburgh, the West will have six of the eleven.

In Cape Colony about 800 miles of railway are about to be constructed at a cost of four or five millions sterling, and in New Zealand there are 550 miles of railway in construction, and 360 more authorized. India has already 5872 miles of railway open, while 1927 miles remain to be completed.

The Grove Brothers, Danville, Pa., have blown in their furnace, and everything works satisfactorily. The Pennsylvania Rolling Mill has started and the prospect is quite encouraging.

Messrs. Abel, Pedder &amp; Co. are making good progress with their new steel works at Beaver Falls, Pa., one building, 150x60 feet, being under roof, and the two Siemens-Martin furnaces being well under way.

## CORPORATE MARK,



## Joseph Rodgers &amp; Sons'

(LIMITED)

## CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

CHARLES PEACE, Jr., Agent.

The demand for Joseph Rodgers &amp; Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam works.

To distinguish Articles of Joseph Rodgers &amp; Sons' Manufacture, please see that they bear their Corporate Mark.

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# H. D. SMITH & CO., PLANTSVILLE, CONN.



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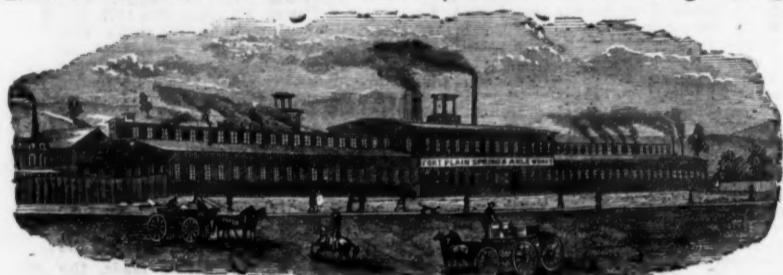
## FORGED CARRIAGE IRONS.

Send for Price List.

### FORT PLAIN SPRING & AXLE WORKS

CLARK, SMITH &amp; CO.,

Green Jacket Axles. FORT PLAIN, N.Y. Fine Carriage Springs.



MANUFACTURERS OF English and Swedes Steel Springs, and Iron and Steel Axles.

Execute orders promptly for

Black, Bright, Tempered and Oil Tempered Springs, of any Pattern or Style. Also for AXLES of any description, from a COMMON LOOSE COLLAR to the FINEST OF STEEL.

Our facilities for manufacturing are very extensive, and with our recent additions of new and improved Machinery, we defy competition.

Send for Price List and Descriptive Circular.

### CARRIAGE BOLTS.

Buy the Best.



Clark's Patent Carriage Bolt.

Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not turn in its place.

MANUFACTURED BY

CLARK BROS. &amp; CO., Milldale, Conn.

Also Manufacturers of

Plow and Machine Bolts, Coach Screws, Nuts, Washers, Tire Blanks, Rivets, &amp;c.

Send for Illustrated Price List

### WILSON MANUFACTURING COMPANY., NEW LONDON, CONN.

MANUFACTURERS OF

### SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws; Parallel Bench Vises; Sash Pulleys, Ho House Pulleys, Composition Clocks, Bench Screws, Vise Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and General Hardware.

GALVANIZING DONE TO ORDER.

WILSON MFG. COMPANY,

Warehouse, 97 Chambers and 81 Reade Streets, N.Y.

### HOOPES & TOWNSEND,

Manufacturers of

### MACHINE & CAR BOLTS,

Cold Punched Square &amp; Hexagon Nuts,

Washers, Rivets, Wood or Lag Screws. Chain Links, Truck and Car Forgings, Bridge Bolts, Bridge Forgings.

### IRONS AND RODS FOR BUILDINGS.

1330 Buttonwood Street.

PHILADELPHIA.

### Philadelphia Star Bolt Works.

#### "STAR"

Carriage and Tire Bolts,

From the Best Brands

of

NORWAY IRON.



#### "STAR" Axle Clip.

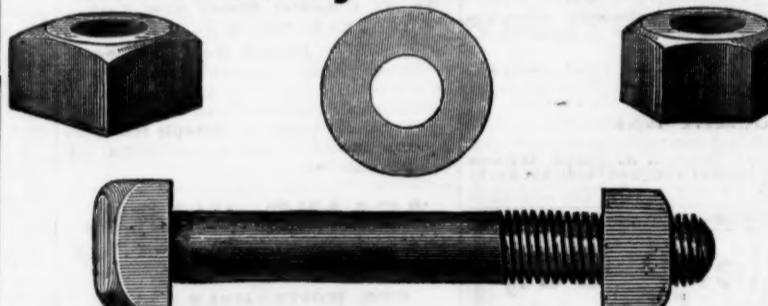
All Styles of

FANCY HEAD BOLTS.

Blank Bolts, Skein Bolts, Square Head Bolts, Plow Bolts, &amp;c., &amp;c., &amp;c.

TOWNSEND, WILSON &amp; HUBBARD, 2301 Cherry St., Philadelphia, Pa.

### Old Colony Rivet Works.



Rivets, Nuts, Washers, Lag Screws, Coleman's Eagle Carriage and Tire Bolts, Axle Clips, Felloe Plates, Shaft Couplings, Stove and Machine Bolts, Drilling Machines, Tire Benders, &c. Full stock constantly on hand.

Warehouse, 34 Warren St., N.Y.



### Cast Brass Butt Hinges

BRASS RIM AND MORTISE LOCKS,  
Ice House Hinges & Fastenings.

Manufactured and for sale by

W. &amp; J. TIEBOUT,

Manufacturers of  
Brass, Galvanized and Ship Chandlery

### HARDWARE.

290 Pearl Street, New York.

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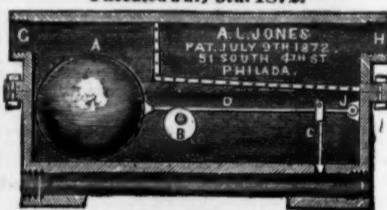
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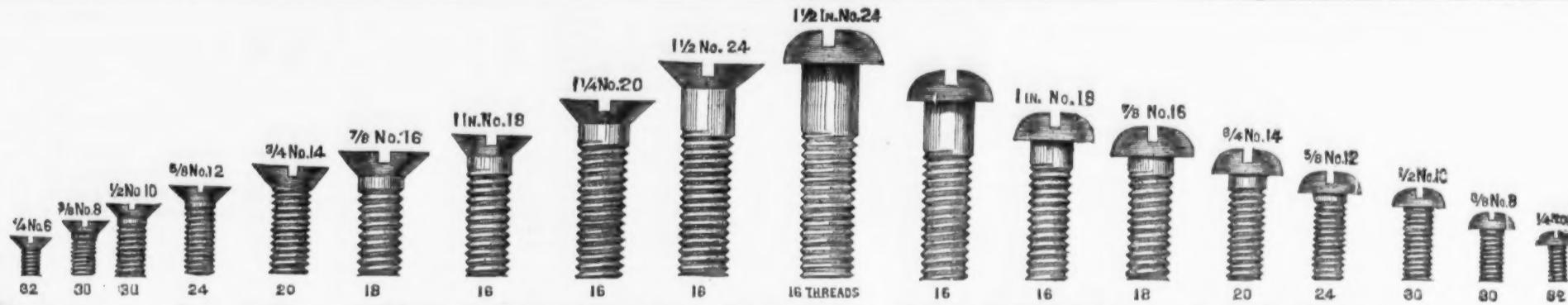
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# The Iron Age.

New York, Thursday, July 22, 1875.

DAVID WILLIAMS - Publisher and Proprietor.  
JAMES C. BAYLES - Editor.  
JOHN S. KING - - Business Manager.

NEW YORK, January 2, 1875.  
Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents.

Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

Our rates of subscription will therefore be as follows:

**Weekly Edition** ..... \$4.50 a year.  
Issued every THURSDAY Morning. Contains full Trade Reports for the week, brought up to the close of business on the previous day.

**Semi-Monthly Edition** ..... \$2.30 a year.  
Issued the FIRST and THIRD THURSDAY of every month. Contains a full Review of the Trade for the previous half month.

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France	6.08	3.08	1.52
Germany	6.08	3.04	1.52
Prussia	6.08	3.04	1.52
Huancayo	8.16	4.08	2.04
Peru	6.08	3.04	1.52
Belgium	6.08	3.04	1.52
Mexico	8.08	4.04	2.04
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Brazil	8.08	4.04	2.04

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on the part of carriers in delivering *The Iron Age*;  
also, the loss of any papers for which the carriers are  
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papers only to persons authorized to receive them,  
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and it is our desire and intention to enforce this rule  
in every instance.

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**The "Interchangeability of Parts"**  
as a System in Manufacture.

In 1826 Thomas Blanchard was granted a patent for a lathe for finishing the barrels of muskets, including the irregular portion next the breech. When set up at Springfield, a stock maker remarked to one of the grinders, "your trade is spoiled, but Blanchard cannot make a lathe to turn gunstocks." The remark was a challenge, and it was not long before Blanchard had a lathe for turning the gunstocks also. In looking back over the history of mankind, we find that a revolution in the mechanic arts is a very rare thing, especially one that takes place within the space of 50 or 55 years. Yet these two machines revolutionized the manufacturing industry of the

## Protecting White Labor against Negro Competition.

We learn from our Southern exchanges that the following petition is circulating among the workingmen in the neighborhood of Atlanta, Ga. and receiving a great many signatures:

We, the undersigned mechanics and working men, appreciating the difficulties that beset us on every hand, and which, through the cupidity of certain proprietors, contractors and capitalists, whose greed of gain would force us into hopeless poverty, and thus virtually enslave us and our children forever, hereby, individually and collectively, pledge our sacred honor that, from and after this date—

1. We will not deal with, in a business way, or support for public office, any man or men (whether grocer, dry goods, provision or other dealer) who oppresses us by employing negro instead of skilled white labor.

2. We will not trade with any retailer dealer who purchases his supplies from a man or men who employ negro labor to the exclusion of skilled white labor.

3. We will not rent a house or houses owned by persons who employ negro to the exclusion of skilled white labor in their construction or repairs.

Freely paraphrased, but without losing its true meaning, this pledge might be made to read as follows:

1. We will not deal with, in a business way, or support for public office, any man or men (whether grocer, dry goods, provision or other dealer), who employs cheap labor in his business. As consumers, we prefer that he should pay higher wages to clerks, porters, truckmen, etc., of our own color, than would secure the services of equally efficient negroes, and are willing to pay more for our food, clothing, etc., and to support that negroes would render equally well and cheaper.

3. We will not rent houses that are built or repaired by any but the highest priced mechanics, although we could rent for less money equally comfortable houses built by negro mechanics.

In the general work of a foundry or machine shop, this system should have a very large place. After deciding upon the style of machine and the details, the first thing is to make the templets, and if it is a work of extreme accuracy, the first set of these are only to be used in producing other templets which, after being fitted with hardened steel wearing surfaces are turned over to the workman. The saving which may be made, for instance, in the fitting of a cylinder to receive its heads, is in both time and labor. Instead of using a machinist to lay out the cylinder, place the center marks of the holes and get it in position under the drill; a well instructed boy puts on the templet, and if strong enough to handle the castings, puts them on the drill, bores the holes, and completes the job in the time it would require the machinist to get ready to drill a single cylinder. The head work is done once for all, the datum lines, the points from which all subsequent operations proceed, are decided by the machine, and after that skill is not required. The trade of the workman is to know how to run a drill, a planer, a milling machine, or whatever else it may be. The objection sometimes raised against this is that the workman does not become a thorough machinist. This is very true, but in these days, what we want is men who understand the business of running a single machine to the best possible advantage. Then we can give him all that he can do, and expect he will give us a maximum product from a given machine. It is in the end an advantage to both workman and employer. In making a machine, say a steam pump, more than three times as much work can be done where all the parts are exact duplicates and made by templet, as by the old method. In some shops where steel bushed templets are used for all work going on to the drills, common laborers tend the machines under the supervision of a foreman. A little more care is needed in the preparation, but this is more than compensated by the saving of time and labor in finishing.

The greater part of the small power steam engines in use in this country are built to gauge and templet. Each part is a duplicate of all others of the same kind, and the indiscriminate mixture of the parts from dozen engines would not give the mechanic any difficulty in the setting up. Repairs are cheap and easily made. The machines, therefore, have a market vastly wider than they would have if built on any other plan. This system is susceptible of a much wider and more general application than it has yet been given, and in many trades which still retain the old method of fitting the parts of each finished article separately, the interchangeability system might be adopted with great advantage. We shall have more to say on this subject in future issues.

the effect of these failures be reflected upon our own country in the loss of trade with those parts of the world? Or let us suppose it is in the use of lumber. Would not the surplus stock of lumber in this country be so reduced that those who had paid for the labor to manufacture the lumber be ruined, and would not all their employees be idle until the surplus stock was used up? The fact is, that the diminished demand for anything which custom has brought into general use must diminish the demand for labor, and thus the loss in this economy falls heaviest at last on the laborer, but from him again to the wholesaler, and so on around in an endless succession of reflections until it has produced general depression in industry and trade.

No one who thinks for a moment can

deny the force of this simple and logical reasoning. The only economy which can do us any good at this time—or, indeed, do us other than serious harm by indefinitely prolonging the industrial and commercial stagnation—is economy in manufacture and all departments of production. Economy of consumption, which means denying ourselves conveniences and luxuries which we can well afford, merely because everybody else is doing so, will only lead us further and further away from national prosperity.

## The Decline in the Value of Quicksilver.

The decline of nearly 50 per cent. in the value of quicksilver during the past six or eight months, in consequence of its increased production in California, and the removal of the seat of hostilities in Spain to the north and southeast, has attracted general attention. In no other part of the world has cinnabar, the common ore of quicksilver, been found so widely disseminated as in California. Until the discoveries in that State, the market depended almost wholly upon the old Almaden, of Spain, and the Idria, of Austria, for this important requisite in the collection of its metallic wealth. The old Almaden quicksilver mine, in La Mancha, Spain, as is well known, was worked seven hundred years before the Christian era, and is still producing more than any other outside of California. The amounts produced by the Almaden mine were:

	Span. cwt. or quintals.
From 1534 to 1646	540,000
" 1646 to 1757	429,560
" 1757 to 1803	460,448

1,420,000 Average production during 279 years, 5126 cwt., of 101 $\frac{1}{2}$  pounds of our weight each, and reducing the whole to flasks at 76 $\frac{1}{2}$  pounds each, it will be seen that the annual production up to the commencement of the present century had been 6800 flasks on an average. The Idria mines of Illyria were discovered in 1497, and from 4000 to 5000 cwt. annually, gradually rose to 12,000 to 16,000. The Huancavelica mines, of Peru, produced from 1570 to 1713, altogether 778,089 cwt., and then gave out.

Spain in 1870 exported 81,136 cwt., equal to 41,511 flasks, the total increase during the preceding five years having been 55,000 cwt. The monthly production of the State of California had reached a year ago something like 3100 flasks of 76 $\frac{1}{2}$  pounds each, toward which the various mines contributed as follows:

New Almaden	1,600
New Idria	600
Other mines	300

being 37,200 flasks per annum, of which about one-half was exported. In 1871, there were produced 31,881 flasks, against 29,546 in 1870, and they were distributed as follows:

To New York	800
To China	7,900
To Mexico	3,081
To South America	2,300
To Australia	1,100
And to other countries	124

15,305

The remaining 16,676 flasks were retained for the consumption of California and Nevada. Since the enormous development of silver mining in Nevada, the amount exported had been gradually falling off, as the following figures will show:

EXPORT OF QUICKSILVER FROM CALIFORNIA.		
Flasks.	Flasks.	Flasks.
1852	900	1863
1853	12,737	1864
1854	18,600	1865
1855	27,165	1866
1856	33,740	1867
1857	27,269	1868
1858	34,142	1869
1859	3,399	1870
1860	9,448	1871
1861	35,995	1872
1862	33,747	1873

This shows a total export during the 21 years of 495,060 flasks, or, on an average, 23,574 annually. The total product of the mines since they were first opened, including last year's yield, which was 34,154 flasks, aggregated 683,979 flasks, or, at 76<math

zinc, and in an energetic manner. The amount of zinc taken up by the water has in many cases within the range of our own experience been sufficient to cause illness. The symptoms produced were in every case characteristic of zinc poisoning.

If the peculiar taste in water delivered from zinc lined pipes is due to contact of the water with the iron, we would like to know what gives the water from a zinc lined cooler its peculiar taste after standing some time therein. What iron is the water exposed to in that case? The author says that galvanized pipes have been extensively used in some cities, and not until recently "have we heard any allegations against its innocence as a medium for water." If his reading is as limited as his knowledge of the subject upon which he writes, it is to be wondered how these allegations ever came to his notice. It is very true that galvanized pipe has been used for a long time, but from the first it has been a cause of complaint. People in some sections of the country have been badly poisoned by such pipes, and as their use increases we shall have more of it. There are a few localities in which the water is of such a character that zinc is not attacked by it, but these are very few and are well known. And yet a newspaper with a reputation for intelligence ventures to assert "that no harm can come to the drinker from water delivered by a galvanized pipe, if it is properly made." The only proper way of making a galvanized pipe of this kind, then, is to omit the zinc from the inside. It is all nonsense to talk about "properly made pipes." The idea of maintaining that a thick coating of zinc presents nothing out of which ordinary drinking water can produce anything injurious is an idea so absurd that if it did not peril human life, it would be immensely funny. It is one of those cases in which an opinion is worth nothing at all, especially when it conflicts with what is definitely known. There are many other errors and misstatements in the article, but they carry with them the evidence of their absurdity, and we scarcely need to waste space in calling attention to them.

Latest files of English papers report a very general improvement in the prospects, but very little improvement in the condition, of the iron industry. At Darlington there was more activity in pig iron, though at lower prices and with large stocks still on the market. In Wolverhampton the iron makers are hopeful. Coal has declined, and at present prices of fuel iron can be made at a profit, but the benefit of the reduction has not yet been felt by the iron trade. At Birmingham the hardware trade was restricted, not so much by the shock given to credit by recent failures as by the approach of the quarter's end and the mid-summer stocktaking, and to some extent, perhaps, the expectation of a fall in prices with declining coal and iron. The factories and workshops, however, were for the most part in full operation, as there are in many branches considerable arrears of orders to be executed before the holidays. This is especially the case in the brass foundry, edge-tool, tin plate work and hollow ware trades. On the other hand, the wire drawing and gun trades are depressed. Advices from other districts have a hopeful tone, but when the actual state of the markets is given, it appears that the improvement is rather prospective than present.

#### The Transmission of Power by Compressed Air.

BY EDWARD J. HALL, JR., PH. B.

As a rule, power is obtained directly by generating steam, natural and transmitted forces being rarely utilized. Wind and water, once so important, have, in the reaction attending the introduction of steam, received less consideration than they deserve. The old-fashioned wind mill is rarely seen, and its disappearance is by no means to be regretted, for, on a large scale, it was cumbersome, weak and unreliable, but its modern forms are still for some kinds of work very cheap and serviceable.

The trouble with water-power is that while a fraction of what is now wasted would supply all our manufactures, it is often inaccessible, and so many considerations beside power determine the value of a mill site that we have accustomed ourselves to overlook many available streams. If, by any system, we can transmit power to a long distance, many such forces, now worthless, would be utilized. Water-power is occasionally transported and used directly, but this is costly and of course only feasible in exceptional cases. There are two sets of conditions under which power may be advantageously transmitted: one in which natural forces can be rendered available in no other way; the other, that in which public safety or convenience is opposed to the independent local generation of power. The ordinary use of steam, especially in large cities, is wasteful and dangerous in the extreme. Very many of the engines being small and used, perhaps, but a part of the time, skillful engineers and firemen are considered too expensive, and persons are employed who are

cheap, because ignorant, but economy in wages is dearly purchased at the expense of oil, fuel, machinery and even life itself, for it is a fact that in this country alone about one person is killed or wounded every day from this cause.

Inventors have sought to improve matters by obtaining a safe prime mover, by improving boiler construction and by transmitting power. Hot air engines are good enough for a moderate power, but the size and strength required are fatal objections to their common use.

Electro-magnetic engines have a high efficiency, but their fuel is too expensive—we cannot afford to consume metals. There are objections to almost every form of patent boiler, cost usually being the great one. No type yet introduced has met with general favor, and none which does not combine cheapness with other advantages will ever, to any extent, supersede the common forms. Neither government laws nor moral considerations can control this matter—it is a matter of business; the steam user desires safety, but must have cheapness, and the deadly record of explosions shows how small a margin aggressive economy leaves to conservative safety.

The water engines have a good efficiency, and leave nothing to be desired on the score of safety; but very few cities have sufficient water pressure to be of much service; the efficiency of conducting pipes, valves, &c., is very low, and there are many other objections to their use.

What is known as *Hirn's telodynamic cable* furnishes means for the successful transmission of power to considerable distances. The principle is to obtain from a light wire cable a large power by making high velocity compensate for lack of mass. An endless wire cable, carried on pulleys, receives a rapid motion from the source of power, and at the point of application this force is given up through a diminishing train. The inventor estimates that 100 horse-power would furnish 75 at a distance of six miles, the cost (including terminal machinery) being about \$5000 per mile. This system is simple, easily constructed, and adapts itself to all irregularities of surface. For large power and long distances it will probably never be used, but for distances less than a mile, such as between the different buildings of a factory, its advantages are undoubtedly great.

All of the systems which do not use compressed air as the medium for transmission are limited in their application by unalterable conditions, but compressed air adapts itself to any and all circumstances; no distance is too great for it, no power too enormous; it can be sent in any direction into the depths of the earth, over the tops of mountains, across rivers or under the busy city streets, always ready to perform its work safely, quietly and surely. Its use is no longer an experiment, for its success has been repeatedly demonstrated in the construction of such great works as the Mont Cenis, Hoosac, Nasquahoning and Sutro tunnels, as well as in a host of smaller enterprises, "Keely's motor" being still private property, we are not yet able to carry around a vessel filled with "cold vapor" at a pressure of 20,000 lbs., and old-fashioned skeptics who cling to the notion that all mechanical energy is derived from heat in some form, are obliged to use cumbersome and expensive apparatus to generate power. Its direct production has, consequently, never been feasible; most forms of underground work, and its transmission from some more or less remote source has been absolutely necessary. Compressed air in these cases has been the only successful resource, and, even were its loss of power very great, the trial takes the shape of machine vs. hand labor, in which contests the former almost invariably triumphs. An accurate estimate of comparative expense at one of the Lake Superior copper mines gave these results: Cost of breaking 1035 tons of rock by hand drilling, at \$1.035 per ton, \$1071.48; cost of breaking 1941 tons by air drill, at \$0.837 per ton, \$1624.84; leaving a balance of 19.8 cents per ton in favor of the use of compressed air. If the air could have been compressed by water-power, the difference would have been much greater; but steam had to be used, and fuel cost \$8 per ton.

There are very many districts on the Pacific coast and in the Northwest where coal is poor and costly, and water-power, though abundant, often inaccessible. It would be, in such cases, both cheap and profitable to use the power at the most convenient point for compressing air. This may be carried for many miles over any sort of country. At Brunswick, Maine, a water wheel condenses air enough to supply several engines operated in different parts of the village, and there would be great economy, convenience and safety in applying a similar plan to large cities. There is no reason why power should not be furnished in service pipes, just as gas and water now are. There are, in every business locality, a host of small engines, many of which run but a small part of the time, each requiring a boiler and attendant, with all the resulting danger and loss from careless work and improper firing. One compressing engine could furnish power for a very large number of establishments, and the various engines supplied would require no attention except to turn the air on and off and occasionally oil the bearings. The minimum of cost would be reached by employing the best skilled labor to run the compressing machinery, and a single engineer could, by taking indicator diagrams, &c., supervise the whole system of engines and keep them all in repair and the best working order. The power supplied to each engine would be measured and paid for only as used. The compressing engine could be comparatively small, for, having suitable storage room, it could run day and night. The power thus stored will keep indefinitely; the receivers at the Mont Cenis tunnel were once left full of air for nearly a month, and the loss was only one five-thousandth of the daily supply.

With such a motive power it would be very easy to extend this system into private houses, and introduce cheap machinery for operating elevators, sewing machines, &c. This air, in expanding to perform work, becomes very cold, and incidental advantages, such as cooling rooms and promoting ventilation, at once suggest themselves.

Possibly some will consider such a plan visionary, but it is not at variance with any natural laws, and its use in similar ways for years demonstrates that it is perfectly feasible. Fifty years ago many of our present every-day applications of practical science would have been considered absurd and impossible. It has been found practicable and desirable to furnish our dwellings with light and water from central sources, the district telegraph connects every house with a system designed for mutual convenience and protection, and it is not at all unreasonable to advance a step further and distribute power in the same way.

This system will never economically supply large manufacturers running continuously, unless water-power is used for compressing, because there are great losses necessarily involved, but these losses would, in the case previously discussed, be more than balanced by other considerations, to some of which reference has been made, while others will suggest themselves.

The distance to which power is carried is comparatively unimportant. Air compressed to 90 pounds and carried for 25 miles, with a velocity of ten feet a second, through a clear pipe four feet in diameter, would lose but *five and one-third per cent.*; deducting this loss, such a discharge would furnish nearly 5000 horse-power per minute. The principal loss occurs at the place of compression, for to secure this discharge of 5000 horse-power an original expenditure of about \$800 would be required, and over 3000 would be lost just as effectively in sending this power one mile as in sending it 50.

This is caused by a loss of the heat generated in compression, and is unavoidable in practice; although theoretically there would be no waste if the compressed air were instantly used. The production and loss of this heat can be illustrated by a very simple experiment with the pneumatic syringe: this is a glass tube with thick sides closed hermetically by a leather piston. At the bottom there is a small cavity in which a piece of tinder is placed. The tube being full of air the piston is suddenly plunged downward; the air thus compressed disengages heat enough to ignite the tinder which burns when the piston is rapidly withdrawn.

The exact amount of the loss due to this cause is readily determined by a few simple equations, which need not here be given. In general, we may conclude that air compressed to from 75 to 100 pounds, and distributed from a central point to a number of consumers, would yield, in actual service, about one-half of the original expenditure of mechanical energy.

[We give Mr. Hall's article as written, but do not fully agree with his conclusions. In certain cases the waste of power has been stated to be as low as 25 per cent. with a possible margin of 5 per cent. to be saved under favorable conditions.—Editor of *The Iron Age*.]

#### Emery Grinding.

In the consideration and discussion of processes for converting material, and the various conditions which attend on the operation of machinery, it is a common thing to hear people say, "Give us precise facts, we do not care about philosophy."

In such branches of science or art to which the term exact can be applied, there is no question as to the great reliance which may be placed in crucial experiments and tabulated results.

There is, however, a great share of what may be called manipulative processes in manufacturing; working iron or wood for example, in which crucial experiments can never be placed as an authority against general results, and the most reliable deductions are formed by what the late Mr. Buckle termed "generalization." A repetition of results is dependent upon constant causes and upon uniform conditions, two things, or rather one thing with two names, which manipulating processes do not generally supply.

It may be proved that under certain conditions a cutting tool will displace 10 lbs. of cast iron in an hour, consuming in the operation one horse-power, or that 10 lbs. of cast iron can be cut away with emery wheels at an expense of so many shillings and so many pence cheaper than the same amount of displacement can be performed with edge tools, yet there may be wanting certain elements which are essential to fix a true value on the performance. Experiments are seldom without value, and on deductions drawn from such premises no small share of engineering knowledge is based, but if a person is to arrange a workshop and provide tools and power for cutting and shaping cast iron, more reliable standards must be looked to; in other words, a large number of experiments under the name of general practice are rather to be followed.

This, of course, is only contending that a great number of unrecorded and uninvestigated results may convey general ideas to be relied upon rather than a single or a few experiments carefully conducted, and that conditions are so various that nothing but the most extended experience can embrace them.

These remarks are set down as preliminary to some notice of emery grinding in metal working, a subject which has engaged a great deal of attention during a few years past, but has not, so far as the writer knows, been carefully investigated as to the precise results which may be attained by emery cutting on soft iron or steel.

The rapidity with which a new invention may become known and adopted is dependent upon

many conditions, generally and mainly, no doubt, from real utility, but sometimes from novelty and advertising; and success in one class of operations generally leads to applying new inventions in other and different operations where it cannot succeed. As to the important and useful results which have followed the general use of emery grinding appliances for the treatment of hard material there is no longer room for opinion. It has rendered possible one of the most important improvements in modern engineering practice, the employment of tempered steel and case hardened iron wherever the conditions of use demand such material. Hard materials are treated by emery wheels nearly with the same facility as soft material, and at but little more expense; in fact, the result produced up to certain limits seems to increase with the hardness of the substance ground; and considering how short a time this grinding process has been in coming about, we may infer that it is to extend to many purposes not yet thought of. Files and conservatisms both being cheaper in England than in America, have prevented English engineers from proceeding so fast in the emery grinding art, a backwardness which, so far as treating soft material is concerned, they will probably have no reason to regret in future.

The principal expense of cutting and shaping iron in a fitting shop may be divided into the interest on capital invested in tools, the wear or deterioration of tools, attendance and power. Beside these, there are other kinds of expense, which, although they may not be so apparent to general observation, will, nevertheless, turn up in the balance sheet at the end of a year's business, or, as is sometimes the case, not until after several years' business. Among these latter are the unhealthiness of processes, danger from fire, danger to life from accidents, opposition to innovations, with other things.

The introduction of an emery grinding machine among machine tools for cutting is like introducing galvanic currents through the hull of an iron ship; from the time when such a machine is started in a fitting shop, or in any part of a works where air currents may carry the flying emery dust amongst machinery, there begins a wear and destruction of running joints, which may not be manifest for a long time, but which may, in the end, destroy more effectively in sending this power one mile as in sending it 50.

This is caused by a loss of the heat generated in compression, and is unavoidable in practice; although theoretically there would be no waste if the compressed air were instantly used. The production and loss of this heat can be illustrated by a very simple experiment with the pneumatic syringe: this is a glass tube with thick sides closed hermetically by a leather piston. At the bottom there is a small cavity in which a piece of tinder is placed. The tube being full of air the piston is suddenly plunged downward; the air thus compressed disengages heat enough to ignite the tinder which burns when the piston is rapidly withdrawn.

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#### The Law of Trade-Marks and their Analogues.

BY ROWLAND COX, ESQ.

##### VII.

In addition to the common law right of property in trade-marks, Congress has provided for their registration and exclusive enjoyment by statute. The act of July 8, 1870, re-enacted in the revised statutes without material alteration, permits a registration in the patent office upon payment of a fee of \$25 and a compliance with other conditions. The registration does not, however, in any wise affect the legal qualities of the mark, except to enable its owner to proceed in the United States courts. The certificate which is issued by the Commissioner of Patents, is in no sense analogous to a patent. On the contrary, it is without any of the important elements of an exclusive grant. It is not even *prima facie* evidence that the registration has been regularly made.

The case of *Smith vs. Reynolds*, recently decided by Judge Blatchford, elucidates very fully the true nature of existing law, and may be quoted with profit at some length. After alluding to the language of the statute, the learned judge writes as follows:

"In respect to a trade-mark, the statute does not authorize the Commissioner of Patents to issue any letters-patent therefor, or to issue any certificate containing a grant thereof. The only certificate he is authorized to issue in reference to the original registration of a trade mark, is that provided for by section 80, which enacts as follows: 'The time of the receipt of any trade-mark at the patent office for registration shall be noted and recorded, and copies of the trade-mark and of the date of the receipt thereof, and of the statement filed therewith, under the seal of the patent office, certified by the commissioner, shall be evidence in any suit in which such trade-mark shall be brought in controversy.' A certified copy of the trade-mark, of the date of its receipt, and of the statement filed therewith—that is, a copy of everything filed and recorded, and of the memorandum of the date of the receipt thereof—is made evidence. But such copy is evidence only that what is shown by it to have been filed was filed. The certificate of the Commissioner, that the parties 'otherwise complied' with the act, can not be substituted for the judgment which a court must pass as to whether there was a declaration filed, and one under oath, and one complying, as to its contents, with the statute. The court is to judge from the 'statement' whether the requirements of recording 'the class of merchandise and the particular description of goods comprised in such class, by which the trade-mark has been or is intended to be appropriated,' have been complied with, and whether the requirement of recording a description of the mode in which the trade mark 'has been or is intended to be applied and used' was complied with. So it is equally for the court to judge whether the requirement as to the filing of the proper declaration was complied with. The general certificate of the Commissioner cannot be taken as evidence on the subject."

Thus, it will be seen, the registration is tantamount only to what the word imports. It is, as it were, the putting on record of the party's right with a description of its metes and bounds.

It will also be gathered from Judge Blatchford's language that unless the terms of the statute are exactly complied with, the statutory right is not acquired. As in the case of a copyright, the court goes behind the seal of the executive and judges for itself whether there has been an omission to observe any one of the steps which are required to be taken in order to confer the privilege. If there has been an omission, even though it be of the least importance, and in the narrowest sense technical, the act of the Commissioner of Patents will be treated as wholly nugatory. Probably three-fourths of the registrations made prior to the creation of the office of Examiner of Trade-Marks are invalid, and will fall of their own weight as soon as tested.

It should not be inferred from the foregoing that the statutory provisions are not of great utility, and highly beneficial in their results. If there be any virtue in recording the evidences of title to real estate there is virtue in making registration of a species of property the value of which is as certain as it is difficult to define. Especially is it the statute useful as affording a means of fixing date of adoption, and preventing infringements through inadvertence; in short, as giving notice to the world of the registrant's title. It is safe to state that a large proportion of the suits which have arisen since the passage of the act are to be attributed indirectly to the failure of the plaintiff to avail himself of the privileges it affords.

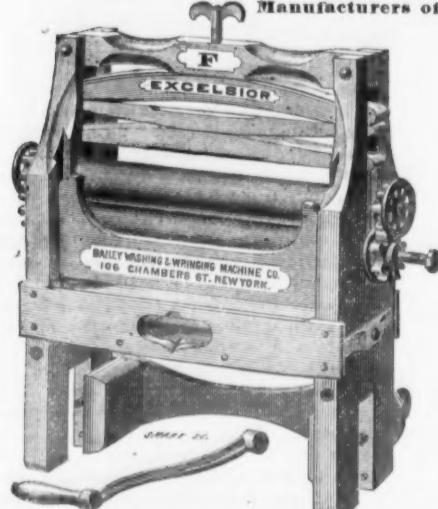
In respect of the terms of the law it will suffice to state that any lawful trade mark, that is, any lawful *technical* trade mark, according to the practice of the patent office, may be registered upon a compliance with the established rules. The protection remains in force for a period of thirty years, and may be extended indefinitely, subject to certain exceptional provisions in the case of foreign marks.

There is, also, an anomalous act passed in June, 1873, which provides for the entry of labels in the patent office upon payment of a fee of six dollars; but it affords no remedy for infringement and no privilege except that of paying the six dollars. The statute was drawn by a gentleman whose knowledge of law is as limited as his knowledge of all other subjects; it is remarkable, and it is, consequently, a palpable blunder. It will serve, however, to open the way to effective legislation which will permit a registration of labels and show cards in a manner substantially the same as that now provided in respect of trade-marks.

Other than these two acts, there is no statute law of general application that has any relation to our subject. Statutes are in force in New York and other States, but experience seems to have demonstrated that in so far as they seek to modify the common law, they are of incon siderable consequence.

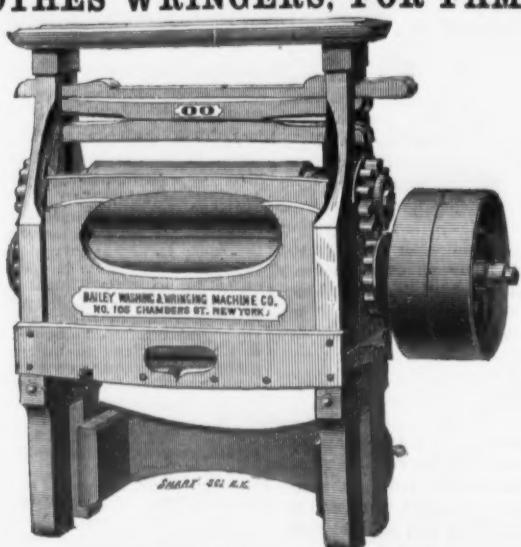
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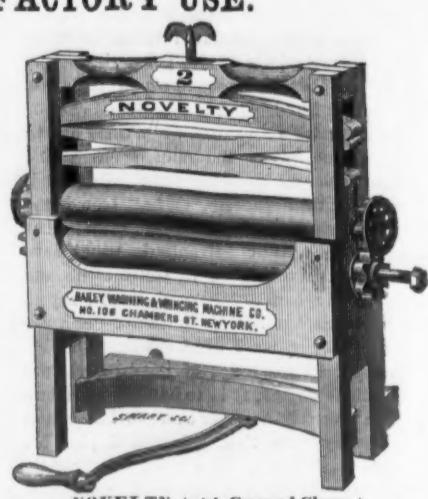
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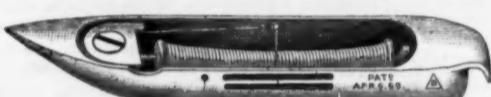
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## Wire-Rod Rolling and Wire-Drawing.

G. BARRY WALL, M. E.

III.

### ROLLING OF THE WIRE RODS.

The billets having been sheared into convenient lengths, are placed in the reheating furnaces, and are then brought to a bright red heat, suitable for rolling. The billet is then passed through the first groove of the roughing rolls—an oval of the first class. Then with the broader side vertical, it is passed through the second—a Gothic square. The Gothic grooves are the most convenient shapes for roughing grooves that can be obtained, on account of the adaptability of that form to any style of groove.

Until very recently it was thought necessary that the billet should be brought down to finishing size with as many passes as was possible while the metal remained sufficiently hot. By means of more rapid revolution of the rolls and greater ratios of reduction, the billet is brought down by at least half the number of passes which were formerly deemed essential to the proper rolling of the rods. In the case under consideration—an 8 from 400 to 475 per minute, and the number of passes for roughing, 7; and for finishing, 3; making in all, 10.

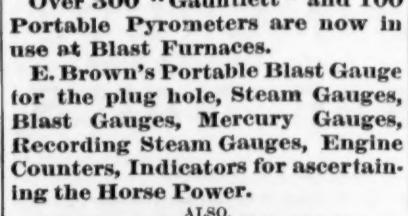
The third pass is through an oval of the first class; the fourth, a Gothic square; fifth, an open square; the sixth, an oval; and the seventh, through a Gothic square. At each pass the billet is so turned that the broader side shall be vertical. From this point it is necessary to make at least three passes for finishing. The bar is first passed through an oval of the second-class, then through a third class oval, and lastly through the dead square or plain circular grooves, according as the finished rod is to be square or circular in section. The rod is coiled while hot by means of a circular revolving frame, and is taken at this stage and pointed, preparatory to the operation of drawing.

### PREPARATION OF THE RODS FOR THE OPERATION OF DRAWING.

The coiled wire rods are removed to common open forges, where the ends are heated and hammered to points, in order that these ends may pass through the holes in the die plates, sufficiently to admit of their being seized by the grippers. Before drawing it is necessary to thoroughly cleanse the rods, to remove the oxide, and thus prevent the scratching and cutting of the surface of the metal when drawn. Large tanks containing a dilute solution of vitriol are provided for the purpose of "cleaning." The coils of wire are placed in the bath, and allowed to remain until the oxide has been sufficiently removed; the length of time employed being, of course, dependant upon the size and shape of the rod. On being removed from the bath the coils are washed in cold water to remove all traces of the acid. The next stage in the preparation of the rods is the "coating" of the wire. Two kinds of coats are employed in America, viz., the "lime coat" and the "lees coat." The former is given to the metal by immersing it in a mixture of lime and water of the consistency of molasses, and the latter by immersion in a mixture of rye flour and water. The object of both of these is to protect the metal from oxidation, and to facilitate the drawing of the wire. Upon the grade and quality of iron employed depends the character of coating to be given it. Charcoal iron is given the lees coat when the metal is to be drawn down to fine sizes; the same with Norway iron. The lime coat is given to the above kinds of iron when spring wire and wire of great strength and stiffness are required. The rods after having been coated are ready for drawing without further treatment.

### ANNEALING.

Wire after being drawn down one or two sizes, must, in order to reduce it further, be annealed, and go through the process of cleaning and coating previously described. Annealing is a process used in manufacture of wire to restore the softness and pliability of the metal, which has been lost by repeated drawing, the metal, by compression, becoming extremely hard and brittle. Annealing consists simply in heating the wire to a low red heat, and allowing it to cool slowly. The operation is carried on in annealing pots, which consist of a cylindrical cast iron pot of a diameter of from three to four feet. The bottom is a cast iron saucer. The top of the pot is flanged so as to receive a lid of the same metal. The whole rests in a vertical furnace set in brick work, the flues being arranged differently, according to the ideas entertained by manufacturers. Direct upward draughts are more used at Blast Furnaces.



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Gauntlet



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The Revolution Indicator is driven like a governor, either from a horizontal or vertical shaft; it constantly indicates, without the use of a watch, the number of turns per minute made by a Steam Engine.

There are many engines which have to run at varying speeds for different operations, also engines controlled entirely by hand. For such, the Revolution Indicator will be found particularly useful.

Circulars on application.

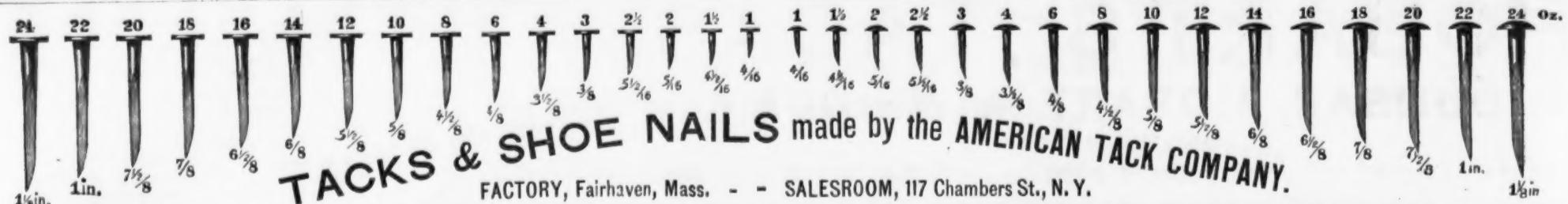
place is provided with stop-cocks, by which the air in the interior is displaced, and an artificial gas substituted. Another is by heating the wire in a bath of flux, such as chromate of calcium, hydrate of potash, hydrate of soda, borate of soda or potash, or other similar compounds. The wire, having been heated in this bath to the required point, is taken out while hot. A thin film or coating of the flux remains, which may be washed off with water when cold. The required properties of the fluxes are: 1st. The property of being non-volatile or only slightly so; 2d. Of having no destructive action upon the wire; 3d. Of fusing to a thin mass at a red heat; and 4th. Of being soluble in cold water after fusion. Many other methods might be mentioned, but nothing would be gained. These different plans have all been tested by manufacturers; but either bad results or prejudices on the part of workmen have led them back to the old form of annealing pot and the common furnace with the direct upward draught.

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N. J.

### Making Steel Pens at Camden, N. J.

Until within a comparatively recent period, all the steel pens used in this country came from England. Now the home manufacture is so well established that it supplies, at least, four-fifths of the demand. As a rule, American pens are better than the English, and they are invariably better than the cheap French and German pens recently introduced. For some time after the successful establishment of American factories, the popular prejudice in favor of foreign articles was so great that the shapes and trade-marks on the best known English pens were generally imitated. That bad custom prevails less and less from year to year. There are, perhaps, half-a-dozen makers in this country who have a trade built up wholly upon the excellence of their own pens bearing their own marks. Another custom that still holds its ground is to stamp pens with the name of stationers who order large lots. The purchaser at retail seeing, for example, "John Smith & Co., Cincinnati" on his pens, imagines that the making of pens is a branch of the business of John Smith & Co., and conceives a high opinion of the enterprise of that firm, which is not at all deserved, since all they had to do with the production of the articles was to order their name put upon them. The best makers are discouraging this practice and maintaining their own trade-marks as much as possible.

Perhaps the most extensive steel pen factory in this country is that of R. Esterbrook & Co., of Camden, N. J., a firm of English Quakers, who brought to this country a full knowledge of the art as practiced in Birmingham, and from insignificant beginnings have built up a business that employs over 200 hands. They make 150 different styles of pens. Probably a dozen or twenty styles at most afford all the different qualities that can be given a pen, the rest being varieties of form and color designed to please the taste and fancy. New devices are constantly produced, like new fashions in dress, the rivalry of manufacturers making it necessary to attract the notice of buyers by novelties which are merely new shapes with old qualities. The steel used is of the finest quality and comes from Sheffield. It is first cut in strips and softened by heating in iron pots sealed with clay in a "muffle," or close furnace. Next the strips go into an acid bath to be cleansed of dirt and scales, and they are then passed, when entirely cold, through trains of rolls, which bring them down to the thickness—or thinness, rather—required. From these thin sheets the flat forms of the pens are punched by lever machines worked by hand. An expert operator will punch about 400 gross a day. What remains of the sheet is a piece of steel lace-work—valuable enough, however, delicate as it is, to be shipped back to England for reworking into steel bars. The "blanks," as the pens in their first form are called, go through two processes to have the openings cut in their backs and the slits in their sides. Next they are shoveled by the bushel into iron boxes, and go back to the furnace to be annealed—a delicate process, requiring first the right degree and duration of heat. Up stairs again to the marking presses they go when cool, and have the names stamped upon them. The next process is called "raising," and consists in pressing each pen separately in a die to bring it into shape. Another heating operation follows, the pens being put in long sheet iron cylinders, which are turned by hand over a slow fire. This is the important process of tempering, and is rather more critical than annealing. A bath of oil cools the pens gradually. They are then put in galvanized iron drums—partly filled with sawdust—rotated rapidly upon shafts. By contact with the sawdust and with each other they receive a bright polish. More processes requiring separate manipulation follow. Each pen is held against a small emery wheel and ground, first lengthwise and then crosswise. One process accelerates and the other retards the flow of ink, so that the two establish a proper equilibrium. Another effect of the grinding is to give additional elasticity to the metal. Up to this time the pens are useless for writing, the essential operation of slitting the points remaining to be gone through. Each is held under a stamping machine which makes the slit. All then go into the examining room where quick eye and nimble fingers detect and separate the imperfect. Different colors are next given by another heating process—exposure for a short time to the fire producing fawn colors, a little longer bronze, and still longer blue and purple. The bright steel colored pens do not go through this process. A bath in a kettle of varnish and a drying-off over a slow fire completes the pen and it is ready for packing. Just how much a gross of each kind will weigh has been ascertained, so that instead of being counted the pens are thrown into a pair of scales from a little brass scoop until the beam turns. The gross thus ascertained by weight is never a pen short or in excess.



Upholstery, Gimp, Brush, Card, Pall and Cheese Box Tacks; Leathered, Tinned and Iron Carpet Tacks; Bright and Blued Finishing Nails; Cigar Box and Chair Nails; Trunk and Clout Nails; Brads, Patent Brads, Copper Tacks and Nails; Iron, Zinc, Steel and Copper Shoe Nails; Polished 2d and 3d Fine Nails; Roofing and Slating Nails; Roofing Tacks and Tinned Tacks and Nails of every variety. Any size or style of Tack or Nail made to sample. Orders sent to either Factory or Salesroom will receive prompt attention.

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THE GENUINE

COES'

**SCREW WRENCHES.**

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NEW PATENT

**FERRULE**

Which cannot be forced back into the handle.

Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be vigorously prosecuted.

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

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**ENGINE LATHEES,**

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Drills; Boring Mills; Tapping and Centering

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## Heavy Hardware AND RAILROAD, MACHINISTS' AND CARRIAGE Builders' Supplies.



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### Lightning and Lightning Conductors.\*

(Continued.)

#### II. ITS EFFECTS.

The effects of atmospheric electricity are, perhaps, better known than those of any other natural phenomenon. They have been principally studied in their destructive results upon ships, upon buildings, upon human beings, and, in our own particular sphere, upon the instruments employed for telegraphic purposes. The case of a ship is very different from that of a building, or an apparatus within a building. A ship is a prominent object, generally a conductor, situated upon a plane—the sea. It thus, if a thunder cloud passes near it, at once reduces the line of resistance between the sea (the inner coating) and the cloud (the exterior coating) of the condenser, determining discharge. Hence it is that so often it has been observed that a heavy black cloud is approaching the ship; and, without any previous warning whatever, a great flash of lightning or an apparent ball of fire has seemingly descended upon the ship, followed at once by an awful clap of thunder. On the other hand, buildings form but an insignificant feature in the large area exposed to induction from a charged cloud. Trees and buildings take but a portion of the charges which in the case of ships have fallen in their whole intensity upon them. Except in the case of very prominent church spires, columns, etc., it is probable that the effects upon buildings are immeasurably smaller than upon ships. Again, in the case of human beings, it is probable that but a small portion of the discharge passes through them; while in the case of telegraphic instruments the quantity of electricity which passes through them is still smaller.

From these causes, the methods that have been adopted for protection, based upon the damage inflicted on ships, have probably led to the adoption of unnecessarily costly and superfluous measures to protect buildings and instruments.

We, in this society, are more interested in the effects of lightning upon instruments, and upon the apparatus constructed for the transmission of telegraphic despatches, though we neither ignore nor neglect its effects in other fields.

The accidents that telegraphs suffer from might be divided into three classes:

1. Those affecting the wires;
2. Those affecting the poles; and
3. Those affecting the instruments.

Each of these classes may be subdivided into those which are the result of the direct discharge, and those which are the result of induction. In the first case the wires, poles or instruments form a path or current for a portion of the discharge itself; in the second place they are influenced by currents which are induced by the approach, motion, or sudden neutralization of charged clouds.

1. (a) *Direct Discharge.*—The direct effects are not nearly so numerous as the induced. In the case of open wires, the discharge forms but rarely anything more than an instance of the passage of a very powerful and instantaneous current. Cases have occurred, however, where this current was so great as to fuse and destroy the line wire; but such cases are very few and far between.

During the past season I can find but two cases where our line wires—viz., No. 8 wires—have been absolutely fused.

(b) *Induction.*—It is evident that the accumulation of a charge upon a cloud converts it into a very powerful inducing body. As the cloud approaches the line it induces in the section of the wire nearest to it an opposite electrical state, and as this change of state is gradual, a current of sensible duration must be observed; but when discharge takes place and the cloud suddenly loses its coercive power, the wire as suddenly recovers its neutral condition, producing a powerful current in the opposite direction. Hence, during a thunder storm, wires are pervaded by repeated currents which ring bells, demagnetize needles, throw ap-

paratus out of adjustment, shock clerks, and make false signals on railway block instruments. During the construction of the Hoosac tunnel, two premature explosions of blasting charges were caused by these currents, producing serious and fatal results.

Not only the over ground wires are affected, but those buried 2 ft. deep underground. I print as an appendix to this paper a very interesting correspondence which took place in the year 1854, between Faraday and Messrs. Latimer, Clark and Culley, upon the demagnetization of needles upon the long underground circuits between London and Manchester, and very recently (July, 1871), while some joints were being made upon the new underground wires between Manchester and Liverpool, the jointer was alarmed by a succession of crackling sparks passing from the wires to his box, which was in contact with the ground.

2. In the case of poles, it has been found that when the pole has formed a portion of the path of the discharge, it has been, in the case of an unprotected pole, shattered to atoms, and one instance occurred where 20 successive poles were very nearly totally destroyed. Usually, however, a discharge, which has taken the wire in its path, divides itself amongst several poles, and cuts out, with the smoothness of a gouge, spiral grooves from the top of the hole to the bottom.

3. In the case of instruments, the effects have been:

(a) *From Direct Discharge.*—Currents of such a strength as to absolutely burst out the cases, burn the woodwork, and fuse the wire of the galvanometers and electro-magnets. An exceptional case of accident has arisen from the wires passing close to gas pipes and the discharge passing across the air fusing the pipe, lighting the gas, and setting the station on fire. Such cases are, however, rare, and have generally occurred at "intermediate" stations where no earth was employed.

(b) *Induction.*—The induced currents being instantaneous and very strong, demagnetize or reverse the polarity of magnetic needles such as those of galvanometers. This was a very prolific source of trouble in former days, but we have recently introduced induced needles which have almost entirely removed the evil. The needle inside the coil deflected by the working cement is not a permanent magnet, but a piece of soft iron temporarily magnetized by the influence of permanent magnets outside the coil; but even these external magnets are sometimes demagnetized.

III.—PROTECTION.

I will now discuss the measures that have been adopted for protection from this destructive force.

1. As regards ships, the method adopted by the great authority, Sir William Snow Harris, has proved itself to be so efficient and perfect that no improvement has been required; nor can any be well suggested. Accidents to shipping have almost entirely disappeared; fishing smacks and small coasting ships are occasionally injured, but we never hear of an accident to the ships of our navy, or rarely to those of our merchant service. Such vessels as have been struck have been invariably unprotected.

2. In the case of buildings, however, there is much room for improvement, not only in the form of the conductor used, but in the extension of its adoption. The heavy cost of a system similar to that used for our ships, has probably had a serious influence in checking the employment of such protectors. I have known men pay from £40 to £50 for protecting their houses; but, as I contend, most unnecessary expense has been incurred in such cases. I hope to show that it is possible for a man to render his house as absolutely safe as a ship suddenly recovers its neutral condition, producing a powerful current in the opposite direction. Hence, during a thunder storm, wires are pervaded by repeated currents which ring bells, demagnetize needles, throw ap-

the ground, i.e., there should be no joint unless it be a well soldered one in the whole of its path. Chains and link rods,\* which were used in the earliest forms of conductors, should be strenuously avoided, and where existing, at once removed. Indeed, every investigation has shown that where damage has occurred to buildings protected by so-called lightning conductors, chains, linked rods, or other imperfect conductors have invariably been used.

2. Its connection with the ground must be sound and good; in fact in the language of the telegraphist, "it must make 'good earth.'"

It may be connected with the iron gas or water mains; or be buried several feet in coke, or attached to metal buried in moist earth, or be carried down a well.†

3. Each conductor—if there be more than one—should make a separate earth if possible, and they should be all connected together, either above or below the surface. The lead roofing, and all external masses of metal in the line of probable discharge should be connected with them.

They should be periodically examined, not only to see that their points remain intact, but that the metallic continuity is perfect, and that they continue to make a good earth.

The only effectual test of such protection is to be made by testing their continuity with the galvanometer and current to see that they offer no resistance. The custom now is to fix them, and then to leave them to chance!

They are never examined. An instance has been brought to my notice in the Island of Jersey, where the lightning protector of a church

was found to be broken off at a distance of 2 feet from the ground, and had been so for years; and the celebrated statue of Scott, in Edinburgh, was seriously damaged, owing to some mischievous person having removed the part which made connection with the ground, out of its receptacle.

The practice adopted by many people to insulate these conductors, is evidently unnecessary, and it is equally absurd to carry them externally to their disfigurement—in the case of church spires, columns and chimneys. It is, however, better to carry the wire externally in the case of dwelling houses, lest they pass too near to the lead gas pipes, which, being themselves good conductors, and soft metal, might be fused.

It is also assumed by some that electricity objects to go round a corner; and it is therefore urged that corners should be avoided; but it is evident, from the known laws of electricity, that this is an unnecessary restriction.

The only point which one has to guard against is that there shall be no points or acute angles in the conductor, lest branch circuits be determined; hence the straighter and more direct its course to the earth the better.

The area protected by the conductor is a matter of much consequence, and it was said by a committee of the French Academy that this area should have a radius equal to twice the height of the conductor from the ground; but cases have occurred, owing to the bifurcation of the discharge, where buildings have been injured at a distance considerably less than this from a conductor. Hence it is thought safer to take the radius as equal to the height of the conductor.

Thus, for small houses, one conductor is enough, but it is safer to attach one to each stack of chimneys. If it project a yard beyond, it is sufficient, for then it is within easy reach of inspection; a matter of some consequence when the principal function of the conductor depends upon the point with which it is surmounted being kept intact.

It is thought that with 30/ for materials and 10/ for labor, any intelligent man can, with these directions and precautions, safely protect his house from the destructive effect of thunder storms.

\* At Monmouth I found a flat braided copper wire rope used about one inch broad. Its continuity is very doubtful. It had points at every 4 or 5 feet standing at right angles to the rope.

† At Lydney Church (Monmouthshire) I found a lightning conductor of iron gas tubing leaded into a loose stone, which simply rested upon a stone paving.

I have recently had the pleasure of inspecting a plan adopted by Mr. W. H. Hyett, of Painswick House, near Stroud, Gloucestershire, by which he has succeeded in converting a 2 inch wrought iron pipe, used for the ventilation of the drains of his house, into a very effective lightning conductor. The wrought iron pipe is carried from beneath the ground to a point 8 feet above the top of the highest chimney. It is there surmounted with a vane having a sharp point some inches above its center, the vane and the point being of copper. It is also connected with the lead coating of the roof. It appears to me to be an excellent and admirable system, worthy of greater adoption.

We will now consider the methods adopted to protect our telegraphs.

I have already pointed out that the system of earth wiring poles has given us an excellent protector, but in addition to this most of our large stations are approached by gutta-percha wires in iron pipes under ground, which form admirable lightning conductors, but, unfortunately, at the expense of the insulating covering. Hence the apparatus at our large stations very rarely suffer from injury.

There are only two forms of lightning conductors introduced into the instruments adopted by the Postal Department. The one applied to the single needle and Morse apparatus, and the other to the Wheatstone's alphabetical instruments.

It was observed that when wires were knotted or tied together, electricity of high potential was discharged across this knot in preference to going through the loop. When a discharge takes place through a non-conductor, such as dry air, at the moment of discharge the resistance along the line of discharge is so far reduced as to allow the passage of the greater part, if not the whole of the current, so that, in point of fact, at the moment when the discharge occurs, through a layer of air or other elastic medium, a conductor of very low resistance is formed. Hence, as a current divides itself in inverse ratio to the resistance opposed to it, the greater portion, if not all, flies across the knot or shunt. This is only an example of Faraday's well known experiment, in which a long wire is so bent that two parts, a & b, near its extremities, approach within a short distance, say  $\frac{1}{4}$  inch in air. If the discharge of a Leyden jar be sent through such a wire, by far the largest portion, if not the whole, of the electricity will pass as a spark across the air at the interval, and not by the metal.

(To be continued.)

In view of Mr. Crookes' successful experiments with light as a motive power, the following account, taken from an astronomical work of 1845, of a similar experiment made about that time, is not without interest. The operator "constructed a small vane, in the form of a common weather-cock, of a very thin plate of copper, about an inch square, attached to one of the finest harpsichord wires about 10 inches long, and nicely balanced at the other end of the wire by a grain of very small shot. The instrument had also fixed to it, in the middle, at right angles to the length of the wire, and in a horizontal direction, a small bit of a very slender sewing needle, about half an inch long, which was made magnetic. In this state the whole instrument might weigh about 10 grains. The vane was supported in the manner of the needle in the mariner's compass, so that it could turn with the greatest ease; and to prevent its being affected by the vibrations of the air, it was inclosed in a glass case or box. The rays of the sun were then thrown upon the broad part of the vane, or copper plate, from a concave mirror of about two feet in diameter, which, passing through the front glass of the box, were collected into the focus of the mirror upon the copper plate. In consequence of this the plate began to move with a slow motion of about an inch in a second of time, till it had moved through a space of about  $2\frac{1}{2}$  inches, when it struck against the back of the box. The mirror being removed, the instrument returned to its former situation, and the rays of the sun being again thrown upon it, it again began to move, and struck against the back of the box as before. This was repeated three or four times, with the same success."

**On the Inflammability of Coals, and on a New Pressed Coal.**

Translated and abridged from Dr. Meidinger's paper in *Dingler's Journal*.

Coals in the more limited sense, as wood charcoal, peat charcoal and coke, the products of coking natural fuels, differ greatly in their inflammability, i.e., in their ability to come to a glow and unite with the oxygen of the air, and in regard to their power when once ignited of continuing to burn if exposed in small lumps to the air. Wood charcoal and coke form the greatest contrast in this respect; the former ignites easily and continues to burn, the latter kindles with difficulty and quickly goes out in the air. Each separate variety of both sorts exhibit quite large differences among themselves. The ordinary wood charcoal kindles with more difficulty than the baker's coal, and, as a rule, is extinguished if it is only lighted at one end, while with the latter the combustion extends over the whole mass and it is completely burned up. In the same way cokes differ from each other very much. Gas cokes are more combustible than the coke of metallurgical works; the so-called San coke is more combustible than the Ruh coke. These differences are probably due to the molecular arrangement of the particles, to their density, and to their power of conducting heat. The denser the substance, depending as it does on the temperature at which it was prepared, the better conductor of heat and electricity it will be, and the more rapidly will the heat developed at one point spread throughout the whole mass. And, moreover, the denser the substance the fewer points of attack will be offered to the oxygen of the air, and the less heat can be generated in a unit of time at a given point. If heat is applied to a small spot on a large piece of pulverized charcoal, to which is added a small quantity of saltpeter and an adhesive substance like gum. The high percentage of ash (4 or 5 times that of charcoal) indicates that clay is also mixed with it. The oxygen in the saltpeter causes the combustion to continue when once started, and probably renders it smokeless. The products of combustion are not entirely odorless; in our samples there was a characteristic odor of ammonia perceptible. The production of carbonic oxide is not probable, at least so long as a single piece burns in the open air. Some samples evoked the unpleasant stupefying smell which always accompanies the combustion of charcoal.

The author then goes on to state that he does not know who was the inventor of this pressed coal, that he first met with in 1860 as a French product, that he afterward obtained some with an English label "combustible stoker." In conclusion, he gives the results of several experiments with different specimens. The calorific effect he puts in one case at about 6400 units, the specific gravity at 0.8, the price one franc for 10 pieces 4 inches long, 1 1/2 inches wide and three-fifths of an inch thick, weighing 26 grammes. The ash amounted to 12 per cent. Other specimens gave different results.

The Clarion (Pa) Republican says: Redbank Furnace, Reynolds & Moorhead proprietors, is the only one in blast in this county. It is an admirably managed institution, and employs from three to four hundred hands.

All the nail kegs made at the Pittsburgh saw mills are needed at the nail factories of Shoemaker & Co. and Zug & Co.

A twenty-four-pot Siemens furnace is being erected in the shovel factory of Hussy, Binns & Co.

The Chesapeake Works, at Harrisburg, still continue in active operation.

**Special Notices.**

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One accustomed to rolling Skelp and  
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# Trade Report.

Office of THE IRON AGE  
WEDNESDAY EVENING, July 21, 1875.

There are indications of a somewhat better feeling in business circles, which indicates rather more confidence than has hitherto been felt in the prospect of rumored activity. From such facts as have come to our knowledge we conclude that any expectations which may be entertained of a great and profitable activity between this and the end of the year will be disappointed. We look for a steady improvement, so gradual as to be scarcely noticeable, but which will lead to a fall and winter trade considerably larger in its aggregate volume and profit than that of last year. It is doubtful if we shall ever again witness a return to the methods of doing business which called for a semi-annual replenishment of stocks. When retail merchants laid in their stocks in the spring, and bought nothing more until fall, they enjoyed the doubtful advantage of larger and longer credits than they can now obtain. Credits are now more restricted, buyers, as the rule, more cautious. The mail and telegraphs, cheap land and water freights, and traveling salesmen always on the road, have rendered it possible for the Western and Southern retailer to buy his stock when he wants it, and as he wants it, and to take advantage of any favorable turn in the market or break in freights. As a consequence, trade is more evenly distributed through the year than formerly, and there would no longer be seasons of special activity in trade, were it not for the fact that in many branches of business the requirements of consumers are different in summer and winter. These changes must be taken into account when estimating the probabilities of the fall trade, and we can now estimate the amount of business done by comparing the aggregate result of one year's trade with that of another.

In the financial markets there is a better feeling, railway stocks having advanced and gold declined, both resulting from an advance in breadstuffs. The money market has continued extremely easy, with rates to borrowers on call at 1 1/2 @ 2 per cent., and on prime borrowers' paper, 3 1/2 @ 5 per cent.

The gold market has been depressed, but there has been a very good borrowing demand, and cash gold has commanded a very fair premium for its use. On Thursday, the Treasury sold \$1,000,000 coin at 114-81 1/4 @ 114-94. The following are the highest and lowest quotations of the gold room:

	Highest.	Lowest.
Thursday.	115	114 1/2
Friday.	115	114 1/2
Saturday.	114 1/2	114 1/2
Monday.	114 1/2	113 1/2
Tuesday.	114 1/2	113 1/2
Wednesday.	113 1/2	112 1/2

The stock market has been strong, but somewhat irregular, with principal dealings in Western Union, St. Paul, Northwest, Lake Shore, Pacific Mail and Erie. We give below the highest and lowest of to-day's quotations of active shares.

Government bonds have declined in sympathy with gold; railway mortgages continue strong, and, with other desirable securities, in good investment demand. We give below the closing quotations of governments. The bank statement is as remarkable and unexplainable as that of last week, although in a different way. The result is a large increase (over \$3,000,000) in both total and surplus reserve, the latter now amounting to \$23,055,550. The following is a comparison of the averages for the past two weeks:

July 10.	July 17.	Differences.
Loans...	\$80,966,800	\$87,558,800 Dec. \$1,908,000
Specie...	16,937,300	16,964,900 Oct. 2,700,000
Leg. tend...	70,661,290	72,795,300 Inc. 3,134,100
Deposits...	250,405,300	250,826,600 Inc. 431,200
Circulation...	18,854,800	18,801,600 Dec. 53,300

The following table shows the foreign trade movements for the week:

Imports.	1873.	1874.	1875.
Total for week.	\$6,590,355	\$6,355,478	\$6,641,229
Prev. reported...	76,647,912	74,075,999	78,458,029

Since Jan. 1....\$29,178,395 \$29,491,477 190,099,251

Among the imports of general merchandise were articles valued as follows:

Quant.	Value.	
Anvils.....	272	\$2,358
Iron goods.....	9	1,469
Bearings.....	11	1,497
Cutlery.....	41	1,497
Guns.....	45	14,683
Hardware.....	51	7,977
Iron, pig, tons.....	46	4,099
Iron, cotton tons.....	800	12,751
Iron, other, tons.....	156	8,148
Met. goods.....	96	12,338
Lead, pigs.....	2,710	16,392
Nails.....	16	1,837
Needles.....	15	5,625
Old metal.....	673	
Platina.....	1	1,129
Saddlery.....	6	1,544
Steel.....	114	30,985
Tin, boxes.....	29,681	24,471
Tin, slabs, 30 lbs.....	394,705	57,784
Wire.....	643	9,145
Zinc.....	318,873	13,603

EXPORTS, EXCLUSIVE OF SPECIE.

Total for the week.	1873.	1874.	1875.
Prev. reported...	\$6,529,664	\$5,308,096	\$5,203,623

Since Jan. 1....\$157,181,573 \$169,943,312 \$188,159,081

EXPORTS OF SPECIE.

Total for the week.	1873.	1874.	1875.
Previously reported...	\$1,962,221	\$6,904,291	

Since Jan. 1....\$58,866,512

Same time in 1874....31,490,141

Same time in 1873....35,941,888

Same time in 1872....44,145,011

The following were the highest and lowest prices of stocks to-day:

Bid.	Ask.	
N. Y. Cen. & Hudson Consolidated.	104 1/4	104
Lake Shore.	60 1/2	60 1/2
R. I. Island.	105 1/2	105 1/2
Del. L. and W.	110 1/2	110 1/2
Illino. Central.	90	90
Wabash.	6	6
Western Union Telegraph.	80	80
Atlantic and Pacific Telegraph.	20 1/2	20
Northwestern.	43 1/2	41 1/2
"    Pref.	55 1/2	54 1/2
Milwaukee & St. Paul.	37 1/2	36 1/2
"    Pref.	60 1/2	59 1/2

Pacific Mail..... 80% 88%  
Erie..... 15% 14%  
Ohio & Mississippi..... 33% 23 1/2%  
Union Pacific..... 74% 73%  
Missouri Pacific..... 49% 49%  
Atlantic and Pacific Pref..... 15% 15%  
C. C. and Ind. Central..... 3 1/2% 3%  
Hannibal & St. Joseph..... 25% 25%  
Quicksilver..... 14% 13%  
    "    Preferred..... 20% 20%  
Adams Express..... 99% 99%

## GENERAL HARDWARE.

The arrival of some buyers from the West and South and an improvement in the inquiry for goods by mail has had the effect of relieving the market to a considerable degree of the dullness which has characterized it for a long time. A good many travelers have already started out, and some of them have been heard from with fair order sheets. The general tone of the market is decidedly firm, and the trade here express the belief that, with but very few exceptions, bottom prices have been reached.

We are informed that the American Screw Company have withdrawn from the association heretofore consisting of the American Screw Company, of Providence, R. I.; National Screw Company, of Hartford, Conn.; United States Screw Company, of Meriden, Conn.; Union Steel Screw Company, of Cleveland, Ohio, and have given notice that after thirty days their prices will be largely reduced, so that the issuing of their next circular will be looked forward to by the trade with some interest.

Already a slight improvement is reported in the demand for Foreign Hardware, and prices continue unchanged. The Wiebusch & Hilger Hardware Co. have been advised by cable of a reduction of one shilling per cwt. on the sterling price of Peter Wright's Anvils, but owing to the large advance in the cost of transportation, the decline will not affect the cost of the goods here, which are quoted as before, 11c. @ 11 1/2c., gold.

Since our last writing, Henry Seymour & Co.'s factory has been damaged by fire. Only a portion of the establishment received serious injury, and we are informed that it will be repaired and in full running order at an early day.

Their agents, the Wiebusch and Hilger Hardware Company, have in stock a complete assortment of their goods. The Hart, Blyden & Mead Manufacturing Co. quote Shovels and Tongs on pages 140 to 144, inclusive, of their illustrated catalogue at discount 55 and 10 and 2 per cent extra for cash, instead of discount 50 and 10 per cent. as formerly.

The demand for Nails continues dull, and prices remain unchanged. The market for standard brands may be quoted firm at \$3-25, net, for 10d., in 200 kg lots, and for small lots, \$3-30 @ \$3-40, according to quantity. There are in the market some outside brands of Nails, which could be purchased in lots of 100 to 200 kgs at 10 cents reduction from the above named figure.

We take from the British *Trade Journal* of a recent date the following handsome acknowledgement of American enterprise:

AN ELABORATE PATTERN BOOK.—We are accustomed to see illustrated trade lists and pattern books irreproachable in their general get up, and displaying no little artistic taste. But although many of our manufacturers may be justly proud of their productions in this line, they must, perforce, yield the palm to an American firm, who have accomplished quite the greatest thing in pattern books it has been our lot to see. Messrs. Mallory, Wheeler & Co., of New Haven, Connecticut, the firm referred to, are, we understand, the largest lock manufacturers in the State. Their pattern book, of which a copy has lately reached us, is a most elaborate affair, measuring 18 1/2 by 14 1/2 inches, and containing 292 pages of heavy white paper—as heavy as Bristol board. It is devoted exclusively to the illustration of locks, keys, padlocks and door knobs, each article being represented of exact size. The drawings show a distinction between the several metals which are represented in bronze of the exact tint. The locks illustrated are of the American type, the majority being of malleable cast iron, with brass, copper, or gun metal bolts and mountings. The keys are shown to be joined in the shank, which admits of their being folded up when not in use.

We are informed that Messrs. Mallory, Wheeler & Co. are shipping their locks pretty extensively to our colonies, and it would appear that they are preparing to attack the English market. One thing is certain, that their pioneer in the shape of this splendid pattern book has already created no little sensation.

The cost of the 2000 copies printed is stated to be \$16,000, and if this correct each single copy has cost 2s. Such a conspicuous example of commercial enterprise deserves recognition.

Mallory, Wheeler & Co., Sargent & Co., Agents, have issued the following descriptive list of new goods, which have been added to their assortment since January, 1875:

### Improved Builders' Mortise Knob Locks.

To Reverse, by simply pulling Latch Bolt forward and turning half round.

5-16 inch Hub. Per doz.

No. 994, 4 1/2 x 3 1/2 in. Lacquered Iron Front, Iron Bolts, Wrought Iron Striking Plate, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... \$8-50

No. 979, 4 1/2 x 3 1/2 in. Lacquered Iron Front, Brass Bolts, Wrought Iron Striking Plate, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 980, 4 1/2 x 3 1/2 in. Lacquered Iron Front, Brass Bolts, Wrought Iron Striking Plate, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 990, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 981, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 982, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 983, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 984, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 985, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 986, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 987, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 988, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 989, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 990, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 991, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 992, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 993, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 994, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 995, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 996, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 997, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 998, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 999, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 990, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler, 24 Changes..... 8-50

No. 991, 4 1/2 x 3 1/2 in. Brass Front and Striking Plate, Brass Bolts, Thin Bit Nickel Key, 1 Rack Tumbler,

No. 1311½, 4½ x 3½ in. Same as 1311, Fancy Bronze Case.....	14'00
No. 1312½, 4½ x 3½ in. Same as 1312, Fancy Bronze Case.....	16'50
No. 1313½, 4½ x 3½ in. Same as 1313, Fancy Bronze Case.....	18'50
No. 1314½, 4½ x 3½ in. Same as 1314, Fancy Bronze Case.....	21'50
Packed in One-Half Dozen Boxes.....	
Nos. 1313, 1313, 1314 are now made with Ornamental Cases.	
<i>Horizontal Rim Knob Locks.</i>	
Right or Left Hand. To Reverse the Hand, take off the Cap and turn over the Latch.	
5-16 inch Hub.....	Per doz.
No. 1502, 4½ x 3½ in. Lever Spring, Two Iron Bolts, with Stop, Iron Hub, Tinned Malleable Iron Key, one Tumbler*.....	\$5 75
No. 1503, 4½ x 3½ in. Lever Spring, Two Iron Bolts, with Stop, Iron Hub, Brass Key, one Tumbler*.....	7 25
No. 1507, 4½ x 3½ in. Lever Spring, Three Iron Bolts, Iron Hub, Tinned Malleable Iron Key†	7 00
No. 1508, 4½ x 3½ in. Lever Spring, Three Iron Bolts, Iron Hub, Brass Key, one Tumbler†.....	8 50
<i>Refrigerator Knobs.</i>	Per doz.
No. 292, Mineral, Japanned Mountings.....	\$2 00
No. 293, Porcelain, Japanned Mountings.....	2 75
No. 294, Porcelain, Plated Mountings.....	6 50
<i>Ornamental Door Knobs.</i>	Per doz.
5-16 inch Spindle.....	Per doz.
No. 316, 2½ in. Porcelain, with Round Orna- mental Norwalk Bronze Rose (Mortise).....	\$4 00
No. 317, 2½ in. Porcelain, with Round Orna- mental Norwalk Bronze Rose (Rim).....	4 00
No. A 3, 2½ in. Silica, with Round Fancy Or- namental Bronze Rose (Mortise).....	9 00
<i>Ornamental Bell Pulls.</i>	Per doz.
No. 456, 1½ in. Porcelain, with Round Orna- mental Norwalk Bronze Rose Keys.....	\$4 50
No. 465, 1½ in. Silica, with Round Silica Rose Keys.....	10 00
No. 468, 1½ in. Silica, with Round Fancy Or- namental Bronze Rose.....	8 00
<i>Ornamental Key Escutcheons.</i>	Per doz.
No. 850, 13-16 in. Ornamental Norwalk Bronze, for Solid Brass Keys.....	\$0 50
No. 855, 13-16 in. Ornamental Norwalk Bronze, for Thin Steel Bit Keys.....	30
No. 860, 13-16 in. Ornamental Fancy Bronze, for Solid Brass Keys.....	65
No. 865, 13-16 in. Ornamental Fancy Bronze, for Thin Steel Bit Keys.....	65
No. 900, Double Key Hole, Ornamental Fancy Bronze, Silica Drop, with Night Key Hole, for Locks Nos. 290, 295, 300, 345.....	8 00
We invite the attention of capital seeking in- vestment to the advertisement of "Special," on page 20. This is a good opportunity to in- vest in a well-established and respectable manu- facturing business.	
<b>BRITISH IRON MARKET.</b>	
(Specially reported by cable for <i>The Iron Age</i> .	
WEDNESDAY, July 21, 1875.	
<b>Scotch Pig.</b> —The demand has fallen off, and but a small business is doing. Makers' prices remain unaltered as follows:	
Coltness No. 1.....	69/
Gartsherrie No. 1.....	68/6
Glengarnock No. 1.....	67/6
Eglinton No. 1.....	62/
<b>Manufactured Iron and Rails</b> remain without change.	
<b>IRON.</b>	
<b>American Pig.</b> —The prevailing dullness which has characterized this branch of industry for so long a time past still continues, and any encouraging symptoms appear to be as far in the future as they did months ago. Occa- sionally advices come to hand from other sec- tions which appear to indicate a trifling revival of trade, but it is only spasmodic, and gen- erally followed by a duller feeling than before. At this market there is scarcely an encouraging feature. Buyers do not evince any disposition to operate, unless compelled to fill some pressing order, and limit their purchases to just the quantity wanted. Little, if any, change can be made in prices, though an actual buyer could, without doubt, pick up what he wanted from second hands on very liberal terms. The more prominent Lehigh companies, however, main- tain a bold front, and, as a rule, refuse decided- ly to consider bids below their ideas. The pro- duction is still only on a moderate scale, and some makers appear inclined to blow out alto- gether rather than submit to further reduction in values. The few transactions that have taken place have been unimportant, and as the terms in all cases are kept private, it is useless to mention them. We quote: No. 1 Foundry, \$26 @ \$28; No. 2 Foundry, \$25 @ \$26; Gray Forge, \$23 @ \$25; White and Mottled, \$21 @ \$22.	
<b>Scotch Pig.</b> —Scarcely anything has been done in Scotch Iron the past week, beyond a few jobbing lots of 10 to 50 tons each, which have been on a basis of ruling prices. Values of large lots are nominal and uncertain, though holders talk pretty steady in the face of the light supply here. Cable offers are still being received to lay stock down here at current values, but importers discourage shipments, in the present stagnation of trade. We quote nominally, Coltness, \$31 50 @ \$32; Glengar- nock, \$32 50 @ \$33; Gartsherrie, \$31 50 @ \$33; Eglinton, \$30 @ \$31.	
<b>Bar.</b> —Manufactured continues quiet and without new features to note. We quote Re- duced Bar at Mill at 2 6c. @ 2 8c.	
<b>Rails.</b> —The general inquiry for New Rails continues moderate, though holders are in- clined to be steady in their views for stock of recent production. Some lots, manufactured some time ago, it is said, could be obtained at a shade concession for cash. Steel Rails are quiet and unchanged. We note sales of 1300 tons English, in bond for Canada, on private terms. We quote at \$47 @ \$50, at the mills, for American, currency, and \$48 @ \$50, gold, for Welsh.	
<b>Old Rails.</b> —Trade still rules rather quiet for Old, though an occasional inquiry is heard of, without, however, resulting in any transac- tions of importance. We quote at \$26 @ \$26 50.	
<b>Scrap.</b> —There was a free movement in Scrap Iron early in the week, and sales reported of 1500 lots—said to be about all the stock here —for shipment to Fall River. The price was not definitely mentioned, but generally sup- posed to have been in the neighborhood of \$32. Later, trade has ruled quiet, but prices are held firmer, and with confidence. We quote at \$32 @ \$32 50.	





## THE IRON AGE.

We quote as follows: Anthracite, \$4.90 @ \$5.50 @ \$7; Cumberland, \$6.50 @ \$7; West Virginia, \$6.75 @ \$7; James River Steam, \$6.25; James River Carbonite, \$9 @ \$9.50; Kanawha House, \$12; American Gas, \$6.75 @ \$7.25; American Canal, \$12 @ \$14; Pennsylvania and Westmoreland, \$6.75; Murphy Run, \$6.50; Newburg Orrel, \$6.50; Sterling Ohio, \$10; Inc. Hall, \$17 @ \$15; Liverpool House Canal, \$17; Liverpool Gas, \$12; Newcastle Gas, \$7; Scotch, \$7.50 @ \$8.

## OLD METALS, PAPER STOCK, &amp;c.

Business in this market has been very dull the past week, and prices remain the same as quoted in our last, with the exception of the selling price of Cast Iron, which has somewhat declined, dealers being unable to obtain more than \$15 per ton of 2240 lbs. Rags and Paper Stock are still without demand, and prices are growing weaker. Other articles present no material change. We quote the following as the current purchasing rates:

**Old Metals.**—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, nevvy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 4½c.; Zinc, 4½c. @ 4½c.; Pewter, No. 1, 18c.; do., No. 2, 8c. @ 12c.; Speeler, 5c. @ 5½c.; Wrought Iron, 1½c.; Sheet do., ½c.; Cast do., ½c.; Machinery, do., ½c.; Rags, &c.—Canvas, Linen, 4½c. @ 5½c.; do. Cotton, No. 1, 6½c. @ 6½c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1½c.; Jute Butts, 1½c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky, Box Rope, 4c.; Oakum Junc., No. 1, 4½c. @ 5c.; No. 2, 2c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2½c. @ 2½c.

## IMPORTATIONS.

*Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending July 20, 1875:*

**Hardware.**  
Barstow E. W. & Son, Upson & Walton, Wire rope, coils, 6  
Chains, 10 Van Wart & McCoy, Packages, 3  
Boker Hermans & Co. Metal pkgs., 16  
Mdse. pkgs., 9 Cutlery, pkgs., 2  
Cutlery, pkgs., 10 Avril, 8  
Baldwin Bros. Tools, cs., 2 Cases, 1  
Files, cs., 2 Wiebush & Higer Mfg. Co.  
Bergmann A. Mdse. pkgs., 21  
Cases, 3 Packages, 5  
Connolly T. J. Orton  
Caskets, 1 Caskets, 4  
Corcoran, C. & Co. Caskets, 5  
Cutlery, cks., 1  
Dickinson Henry, Caskets, 1  
Caskets, 1  
Friedmann & Lauterjung, Scrap, tons, 11  
Mdse. pkgs., 7  
Field A. & Co. Crocker Bros. Pig, tons, 225  
Chains, cks., 2 Henderson Bros. Pig tons, 100  
Fropton E. Guns, cs., 2 Lennox E. S. & Co. Bale lots, 260  
Fuller Bros. Metal lots, 500 Cases, 11  
Cow tics, cks., 3 Nightingale & Kelton, Bars, 376  
Cutlery, cks., 1 Hayden & Tompkins, Phelps, Dodge & Co. Bundles, 168  
Order. Pig, tons, 100 Bars, 177  
Horton John, Cases, 7 Sheet, bxs., 7  
Hildick A. H. Chaffs, cks., 15 Sheet, bxs., 500  
Cases, 1  
Lan & Garlick, Steel.  
Caskets, 7  
Merchants' Dispatch Co. Benedict I. Cases, 13  
Caskets, 7 Bruce Wm. Cases, 217  
Gun wads, cs., 6 Crowell & Coe. Cases, 17  
Guns, cs., 4 Cutlery, cks., 1  
Mason John W. & Co. Mason W. & Co. Wire rope, coils, 6  
Mdse. pkgs., 6  
Moore, J. & Sons, Mdse. pkgs., 6  
Gun caps, cs., 11  
Patrick R. & Co. Gun wads, cs., 2  
Peters Bros. Mdse. pkgs., 3  
Quackenbush, Townsend Caskets, 1  
Co. Russell & Erwin Mfg. Co. Mdse. pkgs., 2  
Rosenfeld Bros. Cases, 2  
Remington E. & Sons, Mdse. pkgs., 4  
Smith, John & Co. Cases, 1  
Schoenauer, Ling & Co. Cases, 4  
Simpson F. H. Packages, 11  
Spies, Kissan & Co. Cutlery cases, cs.  
Gun caps, cs., 2  
Schovener & Daly. Mdse. pkgs., 6  
Schuyler, Hartley & Gra- ham, Mdse. pkgs., 6  
Guns, cs., 2  
Tomes Francis & Co. Cutlery, cks., 2  
Tilleder, G. & Co. Wheeler E. S. & Co. Tin plates, bxs., 500  
Order. Lead, pipe, 1207  
Tin plates, bxs., 4611

## PHILADELPHIA.

PHILADELPHIA, July 20, 1875.

There is nothing to report of novelty in the iron market. The larger furnace companies are very firm in their prices, with no very great stocks in hand, and with such a material curtailment in production that the slight improvement in demand must advance prices. Some additional furnaces have been blown out during the week, but as others in farther western localities are blown in, the average product is about maintained. It is probable that an active trade could be had if makers would accept buyers' offers, as we hear of very considerable orders for Pig Metal in the hands of brokers which cannot be filled, owing to being below current rates. The export trade in breadstuffs, which is increasing very rapidly, promises to create an improvement in all branches of business, and hence in Iron. In Manufactured Irons there is no material change. Bars are slightly more active, if anything, at former prices. Ralls are in better request for Iron, while all the Steel works are busy on present orders, but we hear of offers for future deliveries at prices considerably below present quotations. Indeed, it seems probable that the Bessemer works of the country, built and building, will soon be able to supply the entire Rail demand, at least for the next few years, and at prices which will drive Iron Ralls practically out of the market. Old Ralls are dull and, Scrap lower. There are some transactions in Muck Bar, and

also in Skelp Iron for Wrought Iron Tubes, Pipes, &c. Prices are nominally as at our last, and as follows, viz.:

**Pig Iron.**—No. 1 Foundry, \$27; No. 2, \$25; Gray Forge, \$23 to \$24.  
BARS.—2½c. per lb.  
RAILS.—\$48 to \$50.  
OLD RAILS.—\$36 to \$36.50.

**Scrap.**—\$30 to \$31 for No. 1 Wrought.

The sales have been few, and principally confined to small lots of Foundries and Pipe Irons, with orders on the market for 6000 to 8000 tons Pig Metal at prices below views of holders. **Rails.**—Sales of 1200 tons 56's on private terms, and small sales of light 7's at low prices, one lot of 30 lbs. said to be \$40. Much Bar at \$45, and small sales of Scrap at quotations.

## PITTSBURGH.

PITTSBURGH, July 20, 1875.

**Pig Iron.**—Trade has been very quiet since the date of our last report, as it was very generally supposed it would be, and it is likely to continue so during the balance of the month. However, the producing interest continues hopeful in regard to the immediate future, and the general position of the market, it is generally conceded, is in their favor. The stock both in first and second hands is known to be very much reduced as compared with what it has been for several years past; indeed, it could not be otherwise, in view of the fact that the consumption has been in excess of the production ever since the mills were started up after the lock-out. Some of the mill men are impressed with the conviction that raw iron is good property at current rates, that it is more likely to advance than to decline, and, consequently, that a spurt may take place any day. There is no getting over the fact that, notwithstanding business is dull, the general tone of the market is toward increased strength, and producers appear confident of being able to realize \$25.4 mos., for good Gray Forge just as soon as there is any demand. One of our leading mill men remarked, the other day, that let others do as they would, he was determined to keep a little stock ahead, and as money is easy, there is a disposition to speculate, as Pig Iron is considered a much safer investment than a good deal of the so-called gilt-edged paper. No. 1 Foundry Iron quoted at \$27 to \$28.4 mos.; No. 2, \$25 to \$26; Gray Forge, \$24 to \$25; White and Mottled, \$22 to \$23. Charcoal continues very dull, and Foundry grades are as low now as they have been at any time since the panic.

**MANUFACTURED IRON.**—The general position of the market remains substantially as noted in our report of last week. Business is only fair, although about all that can reasonably be expected at this season of the year. The most of the mills are still in operation, but, in consequence of the hot weather, together with the fact that orders are not coming in very freely, they are mostly working single turn. The complaint most indulged in is not so much a scarcity of orders as unremunerative rates. There is reason to believe that some of our manufacturers will be very well satisfied if their balance account shows that they have held their own during the first half of the year. However, with good crops, the farmers in good condition, and money easy, there is reason to look for at least an average fall trade, and it is hoped that the last half will prove more satisfactory to makers than the first half has. Prices are nominally unchanged, 2½c. @ 2½c., Pittsburgh, and 2½c. @ 2½c., Eastern classification.

**NAILS.**—The Nail trade continues fairly active, fully as much as it usually is at this season of the year. While some of the factories are stopped, others, including Zug & Co., Shoemacher & Co., and Chess, Smyth & Co., are still working away, and Zug & Co. r. port that they are still behind with their orders. Quotations may be given at \$2.90 @ \$3, sixty days, with the usual discount of two per cent, cash. Manufacturers generally are hopeful of a good healthy fall trade, and stocks are light both here and at Wheeling.

**WROUGHT TUBING.**—There is an increasing trade. Some makers report that they are several weeks behind with their orders, and the indications are that there will be a steady demand and healthy trade during the last of the year. No change in the Western list since May; discounts quoted at 35 @ 40 per cent. While there is an Eastern and Western list, it is said that in reality there is not much difference between them.

**WINDOW GLASS.**—Trade is very dull, as it nearly always is at this particular time, and it has been exceedingly unsatisfactory all this year. The volume of business was not much less than usual, but prices have been cut so that there is little or no margin for profit. One of our largest and oldest firms is reported embarrassed, and have called for a meeting of their creditors.

The Pittsburgh Commercial, of July 17, says: The pig metal market remains about the same as at date of last report, not much demand, and sales confined almost exclusively to small lots required for mixtures. Some parties look for a continued depression, with a tendency toward lower prices, while others think the price will remain about the same as at present, if it does not advance, and this latter view seems reasonable when we consider the small stocks on hand and the fact that metal sold for any less than current rates cannot be replaced at same cost. Good brands made from Lake ore are still held at \$24, four months, for Gray Forge. We are reported the following sales:

**BITUMINOUS COAL SMELTED FROM L. S. ORE.**  
200 tons gray forge R. S. \$24.00—time.  
100 tons gray forge, extra. \$26.00—4 mos.  
100 tons mottled forge. \$22.50—4 mos.  
100 tons white and mottled. \$22.00—4 mos.  
100 tons foundry. \$20.50—4 mos.

## CONNELLSVILLE COKE.

400 tons gray forge. \$24.00—time.  
50 tons gray forge. \$22.50—cash.  
10 tons No. 2 foundry. \$24.00—cash.

## CHARCOAL.

100 tons Southern. \$29.00—cash.  
75 tons Nos. 2 and 3 H. R. last week. \$28.00—4 mos.  
55 tons No. 1 H. R. \$30 @ \$33—4 mos.

## ANTHRACITE.

30 tons No. 1 foundry, extra. \$28.00—4 mos.

**NOTE.**—By an accident last week, a sale of 300 tons cold short Allegheny Coke Iron was reported as having been made at \$25, four months, when it should have been given at \$24, time. The error was caused by an unavoidable accident, which made it necessary to reset the report of sales in haste, and therefore it may be considered excusable.

## LOUISVILLE.

Messrs. GEO. H. HULL & CO., under date of July 19, write us as follows: The market for all grades of metal is dull, with a strong tendency to inside figures. The usual time, 4 mos., is allowed on the quotations below:

## HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores, \$27.00 @ 28.00  
" 2 " " " " 25.00 @ 26.00 @ 26.00

" 1 Mill, " " " " 23.00 @ 24.00

" 1 F'dry, from Alabama, Georgia and Tennessee Ores. 25.00 @ 26.00

" 2 F'dry, from Alabama, Georgia and Tennessee Ores. 24.00 @ 25.00

" 1 Mill, from Alabama, Georgia and Tennessee Ores. 23.00 @ 24.00

" 1 Mill, from Kentucky Ores. 24.00 @ 25.00

" 1 Mill, from Kentucky Ores. 23.00 @ 24.00

" 1 Mill, from Alabama, Georgia and Tennessee Ores. 23.00 @ 24.00

## COLD BLAST CHARCOAL.

Hanging Rock Car Wheel W. \$25.00 @ 26.00—4 mos.

Kentucky " " " " 25.00 @ 26.00 @ 26.00

Tennessee " " " " 26.00 @ 26.00 @ 26.00

Georgia " " " " 26.00 @ 26.00 @ 26.00

Alabama " " " " 26.00 @ 26.00 @ 26.00

Machinery and Forge. 26.00 @ 26.00 @ 26.00

Blooms. 26.00 @ 26.00 @ 26.00

**BALTIMORE.**

Messrs. WYTHE & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of

**HOT BLAST STONE COAL AND COKE.**  
No. 1 F'dry, from Hanging Rock Ores, \$25.00 @ 26.00  
" 2 " " " " 24.00 @ 25.00  
" 1 Mill, " " " " 23.00 @ 24.00  
" 1 F'dry, from Alabama, Georgia and Tennessee Ores. 25.00 @ 26.00  
" 2 F'dry, from Alabama, Georgia and Tennessee Ores. 24.00 @ 25.00  
" 1 Mill, from Alabama, Georgia and Tennessee Ores. 23.00 @ 24.00  
" 1 F'dry, from Missouri Ores. 27.00 @ 28.00  
" 2 " " " " 26.00 @ 27.00  
" 1 Mill, " " " " 26.00 @ 27.00

**COLD BLAST CHARCOAL.**  
Car Wheel from Hanging Rock Ores. 35.00 @ 40.00  
" " " " 30.00 @ 33.00  
" " " " 25.00 @ 28.00  
" " " " 20.00 @ 25.00  
Car Wheel from Kentucky Ores. 35.00 @ 35.00

## RICHMOND.

Mrs. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of July 19: The Iron market is unchanged. Prices of last week are fully maintained, and sales are active for first-class cold-blast Charcoal Pig Iron. There is still a considerable supply here of cold-blast Charcoal Irons, offered at low prices, because not well established in their reputation as Wheel Irons.

Virginia cold blast Charcoal Pig Irons. \$30.00 @ 35.00  
" hot " " " " 28.00 @ 32.00  
Va. hot blast Coke Pur. Iron, No. 1 ex. 26.00 @ 27.00  
" " " " 25.00 @ 26.00  
" " " " 24.00 @ 25.00  
Virginia Anthracite, No. 1 ex. 27.00 @ 28.00  
" " " " 26.00 @ 27.00

## BOSTON.

JULY 17.—**Pig** had a ripple of business toward the last of the week, when three or four prominent foundrymen came in, asking bottom prices on 50 ton lots. They each found they could buy here cheaper than order from primary points, and quote prices No. 1 X, 1.0, do., at \$28.50, one party naming one of the most prominent brands. The "slumps" to the prices of Cast Scrap or nearly 20 per cent this week, would suggest that foundrymen generally were buying at lower prices, although our quotations are nominally unchanged. On wharf here No. 1, \$29 to \$31; No. 2, \$24 to \$27, and Gray Forge, \$21 to \$24. **Bar** has been very quiet all the week, seeming to have struck the usual summer dullness. The receipts have not been so large, the supplies for this market having about all reached us. There is no change in quotations, nor any anxiety among holders as to values, the range, \$38 to \$60, covering the run of lots and sizes the buyers are likely to call for. Common Iron is listless and easy, quoting at \$52 to \$56, as to size. **Steel** is very dull in all excepting small machine sizes, in which a small inquiry has been shown this week. We quote American Tool, 15c. to 15½c.; American Machinery, 9½c. to 10c.; do. Cast Tires, 8½c. to 12½c.; Sweet's Excelsior Tire, 7½c.; English Tool, 16c. to 17c. **Copper**, although quoting at 23c., is said to be offering among the stock operators at 22½c., without buyers. The rumor is that one or two parties are controlling the market, which accounts for the quotations remaining so long stationary in face of the fact that manufacturers are not buying, nor making inquiry. For manufactured, we quote New Sheathing, 30c.; Bolts and Brackets, 31c.; Yellow Metal Bolts, 20c. to 22c. **Lead** is easier, but not yet quotably lower. **Pig**, 6c., for Domestic, and 6½c. for Foreign; **Sheet** and **Pipe**, 9½c.; **Lead**, 9½c.; **Wire**, 10c.; **Cast**, 10c.; **Forge**, 11c.; **Brass**, 12c.; **Brass**, 13c.; **Brass**, 14c.; **Brass**, 15c.; **Brass**, 16c.; **Brass**, 17c.; **Brass**, 18c.; **Brass**, 19c.; **Brass**, 20c.; **Brass**, 21c.; **Brass**, 22c.; **Brass**, 23c.; **Brass**, 24c.; **Brass**, 25c.; **Brass**, 26c.; **Brass**, 27c.; **Brass**, 28c.; **Brass**, 29c.; **Brass**, 30c.; **Brass**, 31c.; **Brass**, 32c.; **Brass**, 33c.; **Brass**, 34c.; **Brass**, 35c.; **Brass**, 36c.; **Brass**, 37c.; **Brass</b**

week. It is rumored that some of the iron masters contemplate blowing out furnaces, and it is cited, as an instance in point, that four have already been blown out at the Calder Works. Freights are unaltered, as also is the price of ballast pig iron. Writing on July 2d from Glasgow, Messrs. James Watson & Co. said: "The market for Scotch pig iron has been very firm during the week at advanced quotations. Business has been done in warrants from 59 6/ to 61 1/ each, closing to-day buyers at 60 6/ sellers, 60 7/8. Shipments last week were 13,100 tons, against 6415 tons in the corresponding week of 1874. We quote:

	No. 1.	No. 3.	No. 5.	No. 7.	No. 9.	No. 11.	No. 13.	No. 15.	No. 17.	Prices.
Mr. B. at Glasgow.	13	19	23	26	31	36	41	46	51	63/6
Gartsherrie.	12	18	22	25	30	35	40	45	50	62/6
Coltness.	11	17	21	24	29	34	39	44	49	63/6
Summerlee.	10	16	20	23	28	33	38	43	48	62/6
Langloan.	9	15	19	22	27	32	37	42	47	62/6
Carnbroe.	8	14	18	21	26	31	36	41	46	62/6
Calder, at Port Dundas.	8	14	18	21	26	31	36	41	46	62/6
Glenarnock, at Ardrossan.	8	14	18	21	26	31	36	41	46	62/6
Tay.	7	13	17	20	25	30	35	40	45	60/6
Dalmeny.	6	12	16	19	24	29	34	39	44	60/6
Shotts, at Leith.	5	10	14	17	22	27	32	37	42	64/6
Kinnell at Boness.	5	10	14	17	22	27	32	37	42	59/6

Messrs. John E. Swan & Bros.' prices current, of same place and date, gives the following prices:

Glasgow Brands.	Furnaces			B wing, 118			Furnaces			Prices.
	Furnaces	B wing	Out 39.	Furnaces	B wing	Out 157.	Furnaces	B wing	Out 39.	
Gartsherrie.	13	19	23	16	22	26	63/	69/	75/	63/6
Coltness.	12	18	22	19	25	30	64/	69/	75/	63/6
Summerlee.	10	16	20	8	14	18	62/	67/	72/	64/6
Langloan.	9	15	19	5	11	15	62/	67/	72/	64/6
Carnbroe.	8	14	18	4	10	14	62/	67/	72/	64/6
Calder, at Port Dundas.	8	14	18	2	8	12	62/	67/	72/	64/6
Glenarnock, at Ardrossan.	8	14	18	1	7	11	62/	67/	72/	64/6
Tay.	7	13	17	0	6	10	62/	67/	72/	64/6
Dalmeny.	6	12	16	0	5	9	61/	66/	71/	60/6
Shotts, at Leith.	5	10	14	0	5	9	61/	66/	71/	60/6
Kinnell at Boness.	5	10	14	0	5	9	61/	66/	71/	60/6

\* f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 60/6.

WEST COAST BRANDS—f. o. b. Ardrossan.

	7	2	9	68/	62/	68/
Glengarnock.	7	2	9	68/	62/	68/
Ardeer.	4	1	5	68/	62/	68/
Edington.	6	2	8	68/	62/	68/
Lugar.	5	0	4	68/	62/	68/
Muirkirk.	3	0	3	68/	62/	68/
Portland.	3	0	3	68/	62/	68/
Dalmeny.	6	2	9	61/	60/	68/

WEST COAST BRANDS—f. o. b. in the Forth.

	3	1	4	68/	59/	59/
Kinnell.	3	1	4	68/	59/	59/
Almond.	2	1	3	68/	59/	59/
Carroll (Sel'd)	5	1	6	65/	59/	59/
Carroll (Ord'y)	5	1	6	65/	59/	59/
Lochelly.	1	3	4	62/	59/	59/
Lamphinnans.	0	2	2	62/	59/	59/
Bridges.	0	2	2	62/	59/	59/

Furnaces in blast in Scotland, July 2, 1875—1874—50

Messrs. Wm. Colvin & Co. (Glasgow, July 6) say: "Since the date of our last report the warrant market has been very steady. The extreme prices touched have been 60 3/ and 61 1/ but a great proportion of the business has been done from 60 6/ to 60 9. To-day a few lots have been done at 60 9/ and 60 10 1/ closing with buyers at 60 9. The shipping returns are good, and makers' prices remain steady at the late advance. We quote:

	Deliverable alongside.	No. 1.	No. 3.	No. 5.
G. M. B. at Glasgow.	69/	69/	69/	69/
Gartsherrie.	67/6	69/6	69/6	69/6
Coltness.	69/	69/	69/	69/
Summerlee.	66/6	68/6	68/6	68/6
Langloan.	67/	68/	68/	68/
Carnbroe.	64/	68/	68/	68/
Monkland.	63/	68/	68/	68/
Clifton.	64/	68/	68/	68/
Govan, at Broxburn.	69/	69/	69/	69/
Glenarnock, at Ardrossan.	68/6	62/6	62/6	62/6
Edington.	62/	68/	68/	68/
Dalmeny.	61/	68/	68/	68/
Carroll, at Grangemouth, selected.	67/6	..	..	..
Shotts, at Leith.	68/	68/	68/	68/
Kinnell, at Boness.	62/6	62/6	62/6	62/6
Bur Iron.	68/10	68/10	68/10	68/10
Nail Rods.	59/	59/	59/	59/

SHIPMENTS.

Tons.

Week ending July 3, 1875.

" July 4, 1874.

Total increase .....

Total for 1875.....

TRADES OF SHEFFIELD.

The old story has again to be told, there being no change whatever in the general state of trade here since my last communication was penned. All departments in every branch of the iron and steel industries are reported quiet, and the most diligent inquiry, accompanied by careful observation of visible facts, fails to discover any movement worthy of being recorded in an upward direction. Many of the leading iron and steel works are certainly running three to four days weekly, but it is plain that the orders on hand in several departments are neither large nor numerous, seeing that only single shifts are being worked. Most of the blast furnaces of the district are blowing, but it is believed that at more than one establishment very heavy stocks of pig iron are held.

I notice that a district newspaper states that the Midland Iron Company's Works, near Rotherham, are at an entire standstill, owing to the absence of orders at remunerative prices, and are likely to remain so for some weeks to come. "Up to a week back," adds the same journal, "these works were about the best employed in the district." I am not prepared to endorse the whole of this statement, but I believe the works are standing—whether for stock taking purposes or not I am not able to state. It may be mentioned, however, that the Midland Iron Company has for several years paid the best dividend of all the local iron companies—a fact partly owing to its comparatively small capital—and is managed by a most practical board of directors. At two or three other large iron-works near Sheffield and Rotherham the major parts of the machinery are laid off, and many workmen are consequently thrown wholly or partially out of employment. A tolerably large tonnage of North Lincolnshire and Northamptonshire ironstone and ores is being brought into this neighborhood, several local furnaces being exclusively supplied with these materials. At Renishaw and some other Derbyshire establishments, ironstone of excellent quality is obtainable almost on the spot, its presence in each close contiguity to the coal supply rendering it of great value. Pig iron is not much altered in value from last week's prices. The following are current quotations for hematite pigs: "Maryport" hematite, No. 3, 82 1/2; No. 4, 82 1/2; No. 5, mottled and white, 81 1/2 to 82 1/2; "Bessemer" No. 1, 84 1/2; No. 2, 82 1/2; and No. 3, 82 1/2—per ton, with 2 1/2 off for prompt cash. "Bessemer" No. 1, 90; No. 2, 87 3/4; No. 3, 85 1/2; "ordinary" No. 3, 85 1/2; No. 4, 84 1/2; No. 5, 90; mottled, 95 1/2; and white, 90, on the usual four months' terms, or with the customary discount for prompt payment in cash.

In consequence of the Spanish mines being still to a great extent non-productive, a good deal of hematite ore is now being imported from Eibar and Algiers for use at the Bessmer

works here and in other parts of the country. Ores of these descriptions can be bought on the spot at very low prices, and the freights being some 7/ or 8/ per ton only, it follows that it is far cheaper to import them than to use British ores of the same class. The general cast steel trade is not quite so well employed as it was a fortnight or so back, orders having been worked off without having been replaced.

Advices from New York of recent date state that trade is excessively dull, and that there is some difficulty in ascertaining whether it is safe to deliver even such few small lots as are sold. I have also private letters from English travelers at Quebec and Montreal, stating that trade in the Dominion is anything but brisk, that there is more competition than ever, and that the American edge tool, shovel, etc., makers can "run our makers out" of that market by selling goods made from Sheffield steel.

Davy Brothers & Co., limited, have declared a dividend of 15 per cent. for the year. The strike at the Denaby Main Colliery has been lengthened amicably arranged, and the men have now resumed work. The coal trade remains exceedingly quiet, and a further reduction in prices will probably be announced a day or two later than this.



Prices Reduced for Little Joker, STANDARD, Paragon, Tycoon & Whitney's Revolvers.

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Shooting Tackle, &c., furnished to DEALERS only.

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## HERCULES IRON CUTTER.

No. 1, weight 16 lbs., cuts  $\frac{1}{2} \times 2$  inch, or  $\frac{1}{2}$  inch round or square. . . . . Price \$25.00  
No. 2, " 165 "  $\frac{1}{2} \times 3$  "  $\frac{1}{2}$  " " " " 50.00  
No. 3, " 350 "  $\frac{1}{2} \times 4$  " 1 " " " 75.00

This is by far the most powerful Iron Cutter in use which can be worked by hand, having three times the capacity of any other machine which sells at the same price. The No. 3 machine occupies a space of  $12 \times 30$  inches; when in use additional space must be had for the lever to work in. We send two sets of knives, with one machine for square and flat, the other for round iron and steel. By using the knives adapted for square and flat, the other for round iron and steel. One man can cut the largest size iron named above, but two would be required for steady work. It does not take a minute to change the knives or to shift the machine from large to small sizes.

Augusta, Ga., March 3, 1875.  
We would have sent the amount before, but did not have an opportunity of trying the Iron Cutter until a few days ago. It is one of the best machines we ever saw.

Yours, truly, MOORE & CO.

Office of the ATHENS FOUNDRY AND MACHINE WORKS,  
ATHENS, Ga., February 18, 1875.

H. L. PRATT, President.—Dear Sir, Enclosed find draft made payable to your order by Messrs. Childs, Nickerson & Co., in payment for Iron Cutter. We have put our Cutter to good service, and find it cuts readily  $\frac{1}{2}$  round, and  $\frac{3}{4} \times \frac{3}{4}$  square iron. C. N. & Co. are pleased with theirs, say it will save many a blow and cold chisel in their iron house.

Truly yours, R. NICKERSON, Agent.  
We make a satisfactory discount to dealers, and warrant the cutters to do all which we claim for them. Send for prices.

### Millers Falls Company,

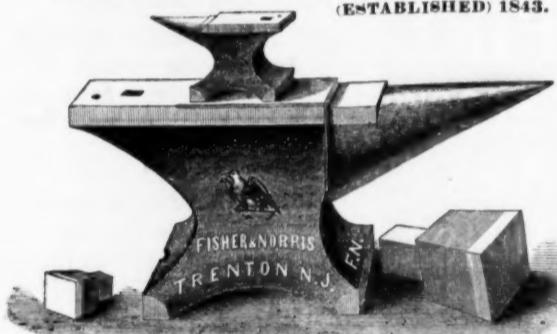
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Sole Proprietors and Manufacturers of the

Barber Self-Fitting Bit Braces, Millers Falls Vises,  
Improved Angular and Ratchet Drilling Machines,  
TUBE SCRAPERS, FAMILY TOOL CHESTS,  
Patent Adjustable Tool Holders, Mitre Boxes, Ratchet  
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### PATENT BOLT HEADER

Every Railroad Shop, Car Shop, Machine & Bolt Shop, Mower,  
Reaper & Plow Manufacturer, should have one.

Three sizes of these machines are made, viz:

No. 1 will make bolts from  $\frac{1}{2}$  inch down.  
No. 2 " "  $\frac{1}{4}$  " " " " 1  
No. 3 " "  $\frac{1}{8}$  " " " " 1

The three sizes if run together would require from 2 to  $2\frac{1}{2}$  horse-power. The variety of shapes that can be made are only limited by the ingenuity of the owner. A few minutes only are required to make a change from one shape or size to another. All dies are made of steel.

T. Bunting, Countersunk, Rivet and Round Head; Plow and Track Bolts, &c., are made at one revolution. Square and Hexagon Heads require from 3 to 5 revolutions.

For Simplicity, Durability and Compactness it has no equal.

A boy can learn to run it in a few hours. The bolt is made on the heated bar and cut off in the machine to any length from 1 to 10 inches; if greater lengths are desired, they should be cut before heating. Either Round or Square Iron may be used.

Will use up as much iron as can be heated in any ordinary blast fire.

For prices and further particulars, address,

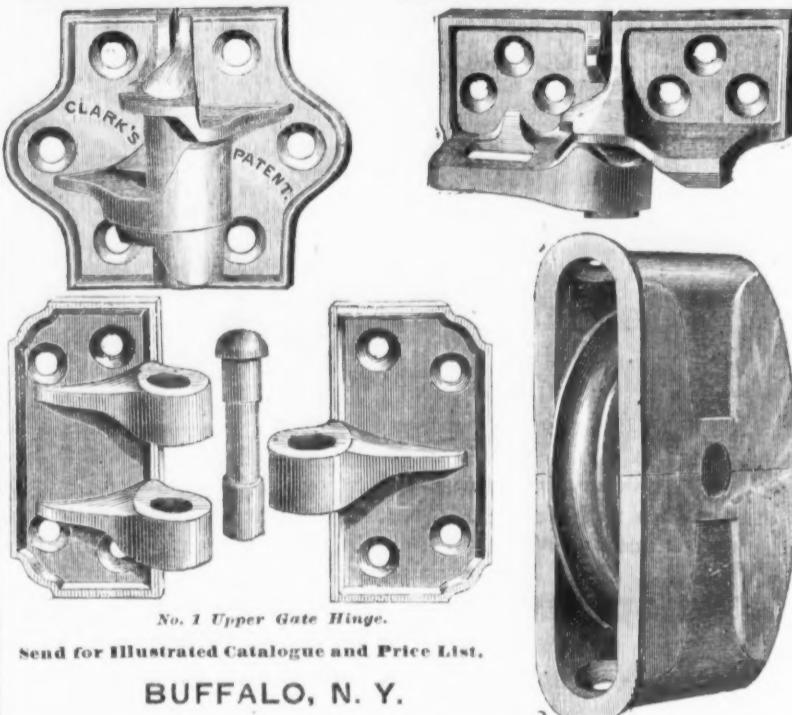
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These implements, though but four years before the public in their present form, show the following remarkable record:  
1500 were sold in the season of 1871.  
14,976 were sold in the season of 1872.  
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30,000 will be made for the season of 1875.  
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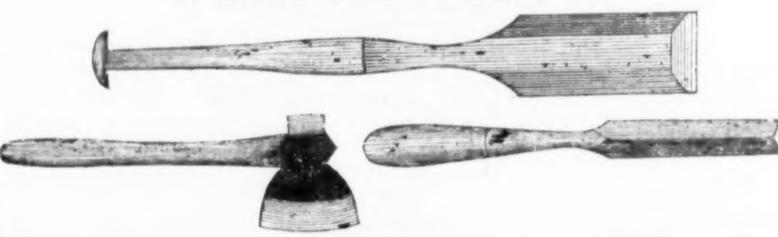
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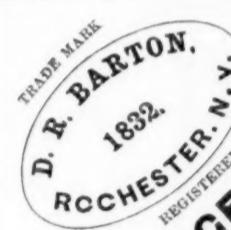


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All goods stamped D. R. BARTON & CO., are made at the Old Works, and by the old men, from the Best English Steel, manufactured for us by Thos. Firth & Sons, and Wm. Jessop & Sons, and fully warranted.

Goods stamped D. R. BARTON are not made at the Old Works of the company, but by a new stock company, formed about the time of Mr. Barton's decease.



TRADE MARK.  
D. R. BARTON.  
REGISTERED.  
1832.  
RCHESTER, N. Y.  
"D. R. BARTON" Edge Tools,  
ONLY GENUINE  
D. R. BARTON TOOL CO.  
Manufactured by  
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CHARLES C. BARTON,  
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Made, Sold nor Warranted by us.

### NEW MODEL DERINGER REVOLVER.



An exact model of S. & W. No. 1 Revolver.

This arm is Half Nickel Plated, and is equal in style of finish to the best arms in the country. Quality of workmanship and material first-class, and guaranteed in every respect.

Price less than any other Hinge Barrel Cartridge Revolver

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Oil Well Tubing and Casing, Gas and Steam Fittings, Brass and Steam Fitters' Tools, Cast Iron Gas and Water Pipe, Street Lamp Posts and Lanterns, Improved Coal-Gas Apparatus, Improved Sugar Machinery, Etc.

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IRON AND WOOD. 30 different styles. 90,000 ALREADY IN USE.

Smooth Planes,  
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[No. 9½ Excelsior Block Plane, \$2.00.]

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**New Patent "X" Razor Strap.**

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This Strap, designated on our List as Letter "X," is of novel construction—is elastic, pleasantly yielding to the razor—gives a keen fine edge—is made of superior stock—is furnished at a low price—and gives universal satisfaction.

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## Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

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## Our Celebrated CROSS-CUT AND WOOD SAWS.

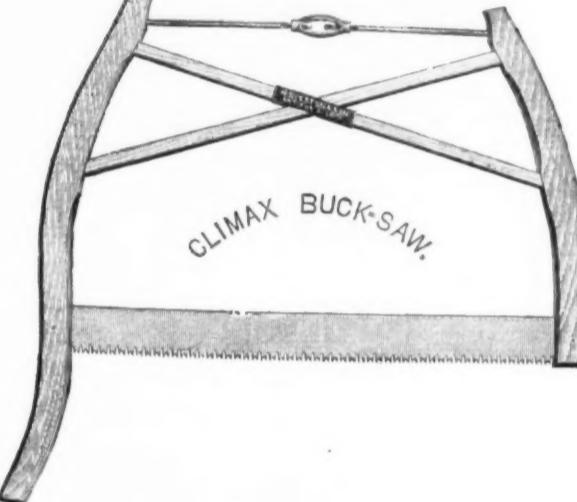
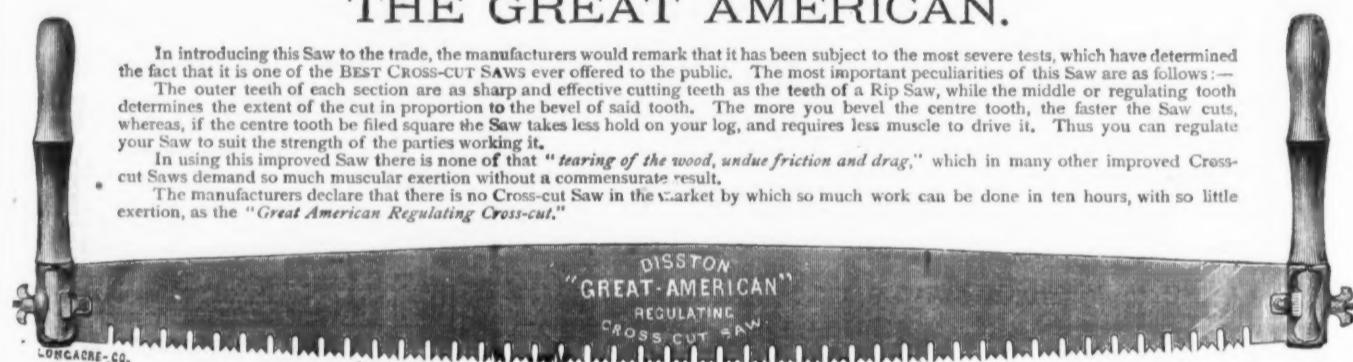
### THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the **BEST CROSS-CUT SAWS** ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

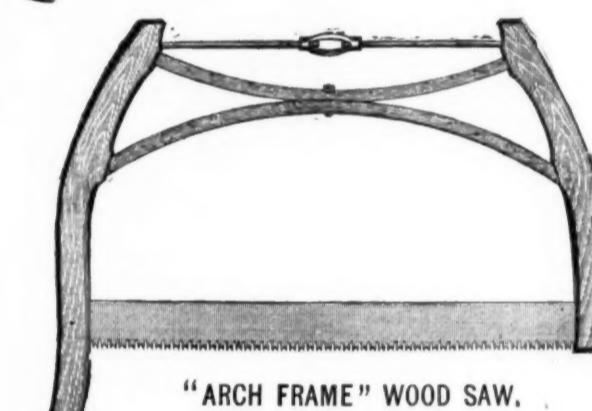
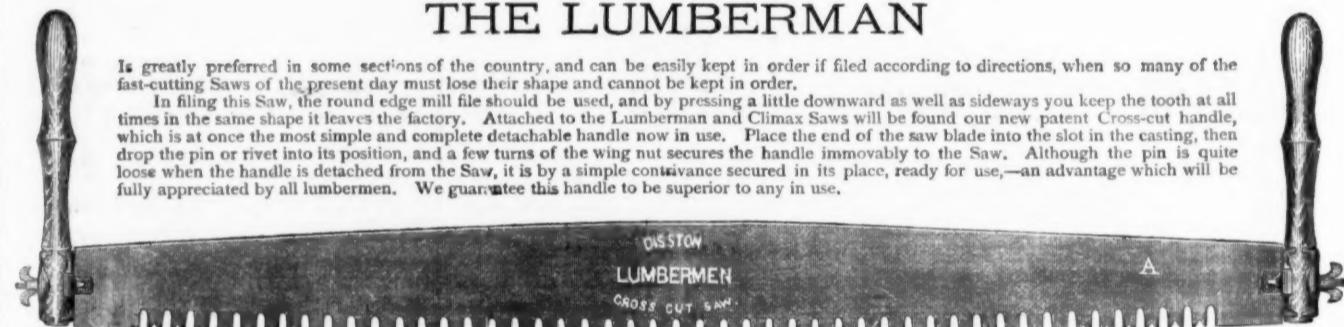
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



### THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

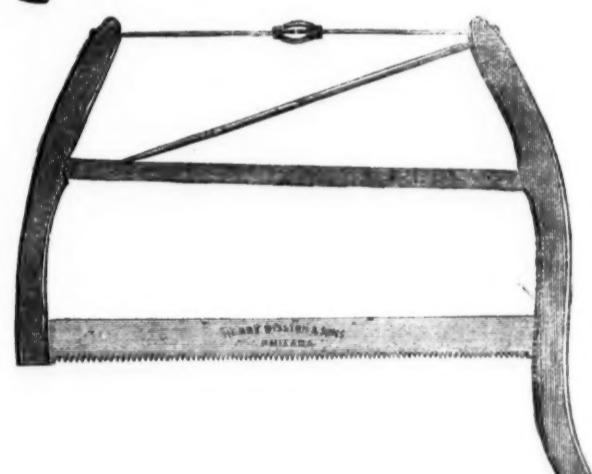
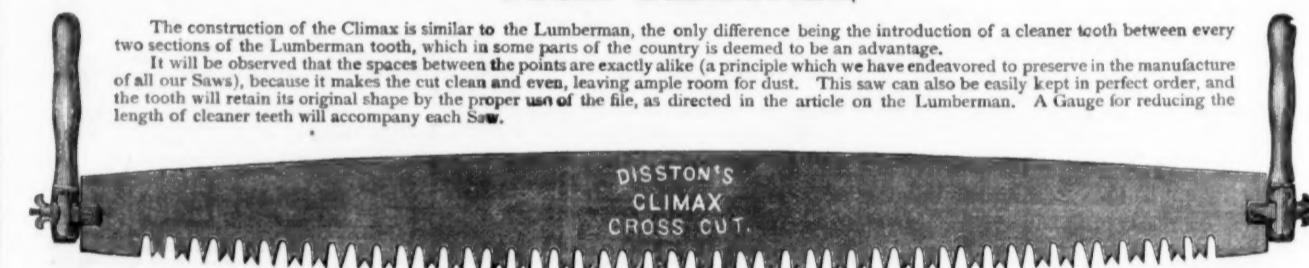
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



### THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

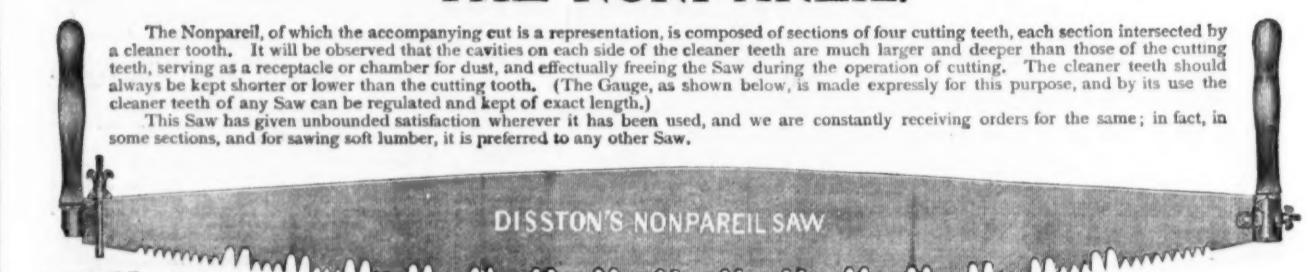
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



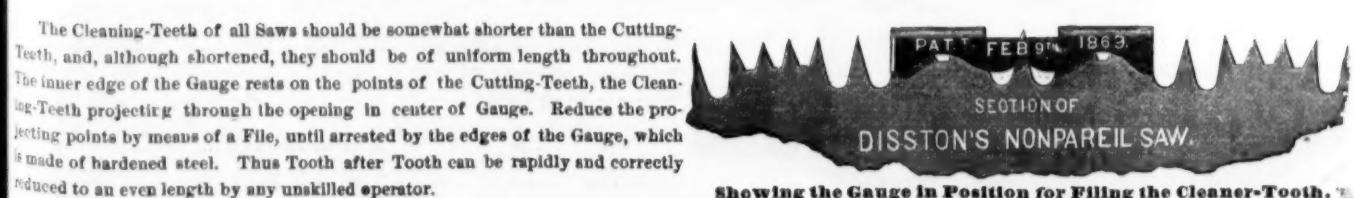
### THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



### GAUGE FOR REGULATING CLEANING-TEETH.



DISSTON'S WOOD SAW FRAME.

Sheffield Manufactures in the American Market.

A correspondent of the *Sheffield Independent* writing from New York, sends that journal a gloomy account of the prospects of trade with this country. We quote without comment:

When in 1870 and 1871 the purchasing power of the people of the South began to decline, and with masterly wisdom Sheffield manufacturers advanced their prices 25 per cent., the knell of the table knife trade sounded. Since then the competition among Yankee makers has put the Sheffielder nowhere. They can and do sell a better knife at \$9, currency, than a Sheffield man can lay down here at \$10.50 in gold. To all intents and purposes this middle-class table knife trade is lost to Sheffield, it seems, forever; for in spite of there being any one therein employed almost constantly in an embarrassed financial condition, and selling constantly below cost, the Yankee companies have always been able to carry on and keep the Sheffielder out. What they would do if Sheffield prices fell 25 per cent., or the duty was lowered, or the premium on gold was annihilated, or if all three came at once, I will not say, but barring some such *dens ex machina*, I see no deliverer at hand worth counting upon. Thus in, say 10 years, was one large, labor employing business lost to Sheffield. Next to the table knife trade the extinction of the saw trade has been, perhaps, most complete. In this article the American manufacturers actually dictated the duty imposed under the tariff of 1861. It was not "how much will the trade bear?" but "what will absolutely exclude Sheffield goods?" By the use of *ad valorem* and specific duties this last condition has been practically accomplished, and at Philadelphia and in New England saw factories on a very large scale, and conducted with eminent skill supply the whole country and actually export to neutral markets.

The steel trade trembles in the balance. Cheap steels are just as much the staple products of steel makers here as in Sheffield, and in truth Sheffield cannot compete with the native makers in them, probably not even if a revenue tariff was imposed. Practical men regard the trade in cheap steel as lost to Sheffield; and that in best cast steel will follow, if the existing state of things last long enough to breed up a sufficient number of practical workmen in the trade. At any rate, any dependence on Sheffield for steel of any kind is over and gone.

The file trade is another instance of the use made of machinery in producing an article usually made by hand. By adopting machinery, the production of cheap files in Sheffield for this market has been brought to an end. The machine cut, machine forged, machine ground files of this country render the exportation of any but the best files from Sheffield useless. Even they are kept down in price by the best makers here, who sell a file in currency against the Sheffield file in gold which gives certain satisfaction. The quantity of files made in this country is enormous. It is a moot point whether it is possible to sell the best Sheffield files here at all and make a profit.

Perhaps the cutlery or pocket knife trade is, and will remain, the last that will be swallowed, and it all depends how soon tariff relief comes how long even this trade has to live.

A gentleman of Boston is the owner of a miniature steam yacht, 17 feet long and 42 inch beam, with hull weighing but 100 pounds. She is propelled by a steel boiler weighing only 48 pounds, with a cylinder of 1 1/4 inch, and a stroke of 2 1/4 inches. The propeller is four-bladed, and is placed under the boat 2 feet from the stern. One gallon of water fills the boiler, and as it condenses it is only necessary to supply the waste. The boat draws 24 inches of water, which carries her propeller clear. She cost about \$500, and is rated half horse-power. Her owner recently made a voyage with her from Boston to Portland, Me.

The Pittsburgh Bolt Company, which was compelled to make an assignment on account of the suspension of the firm of Gerry, Tilton & Caldwell, iron brokers, of this city, will continue operations until the stock is worked up and all orders are filled. The stockholders hope that arrangements can be made that will bring their financial difficulties to a satisfactory end.

Blood's Locomotive Works, at Manchester, N. H., will be run for the present only five days in a week. About 150 workmen are employed there now, which is less than one-fourth required to run the works at the full capacity.

Tibbals, Shirk & Whitehead, Erie, Pa., are now employing some 90 people, and making casts of eight tons of stoves per day, on general patterns of cooking and heating, parlor, office and hall stoves.

The people of New Freeport, Greene county, Pa., are agitating the building of a narrow gauge railroad from that place to a point on the Baltimore & Ohio Railroad, six miles in length.

For the week ending on the 4th of July, Lock Haven, Pa., sent 1,061,000 feet of lumber to market. The total amount sent for the season thus far foots up 17,122,000 feet.

The American Tool Company is running its foundry at Hyde Park, Mass., about two-thirds of the time, and with half the usual number of hands.

The New Lexington (O.) *Tribune* says it is very probable that a blast furnace will be located at North Ferrara during the summer.

The tack factory at Assonet, Mass., will resume operations this month, with an increased number of machines.



## Stafford Manufacturing Co.'s STENCIL COMBINATIONS.

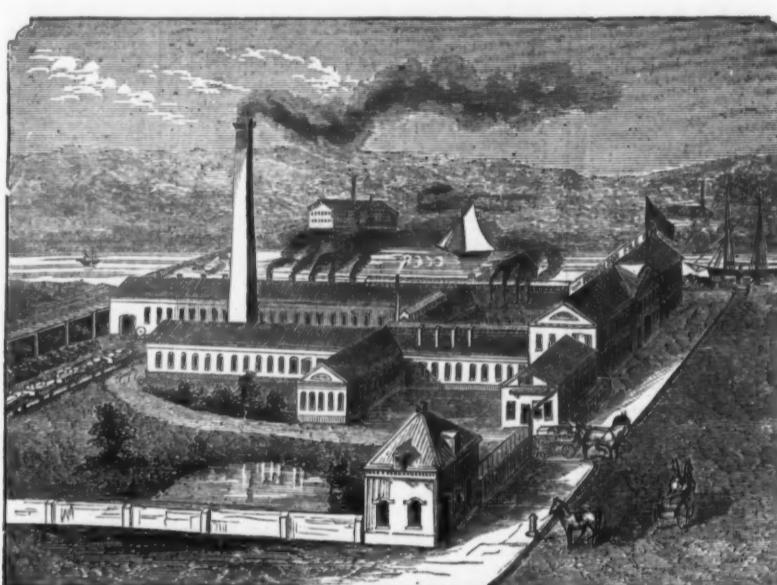
Containing: Stencil Alphabet, Figures, Car Stencil Ink and Brush. For marking boxes, barrels, bags, and packages for shipment. Printing all manner of show cards, notices, signs, numbers, prices, &c., and other purposes too numerous to mention. Instructive and amusing for boys.

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Size, 3/4 in., per dozen.....	\$6.00	Size, 1 1/4 in., per dozen.....	\$10.00
1 1/2 " " " 6.50		2 1/2 " " " 12.00	
1 1/2 " " " 7.00		3 1/2 " " " 18.00	
1 1/2 " " " 9.00		1 1/2 " with lower case.....	15.00

An illustration of sizes sent on application. For sale by Hardware Dealers and Stationers.

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**Fifth.**—They will not "pin" or scratch like hand-cut Files.

**Sixth.**—The "Increment cut" File, by our records, will remove more stock with a given number of pounds applied than any other File with which we are acquainted.

**Seventh.**—All Files under seven inches are put up in boxes of one dozen each, and neatly labeled.

**Eighth.**—The large stock carried by us, combined with our superior facilities, enables us to fill the largest orders at the shortest possible notice.

**Ninth.**—We are constantly making careful tests of our Files by delicately constructed machinery, which automatically records the actual power applied, forward, backward and downward, at each stroke of the File, also the number of strokes, combined with the work performed, enables us not only to judge of the quality of our Steel for wear, but also of the cutting qualities of the File, and the ease (expressed in pounds) with which a given amount of work can be accomplished.

**Finally.**—Our Files are warranted to be hard, well cut and sound. They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of our ability to furnish a good article cheap, is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

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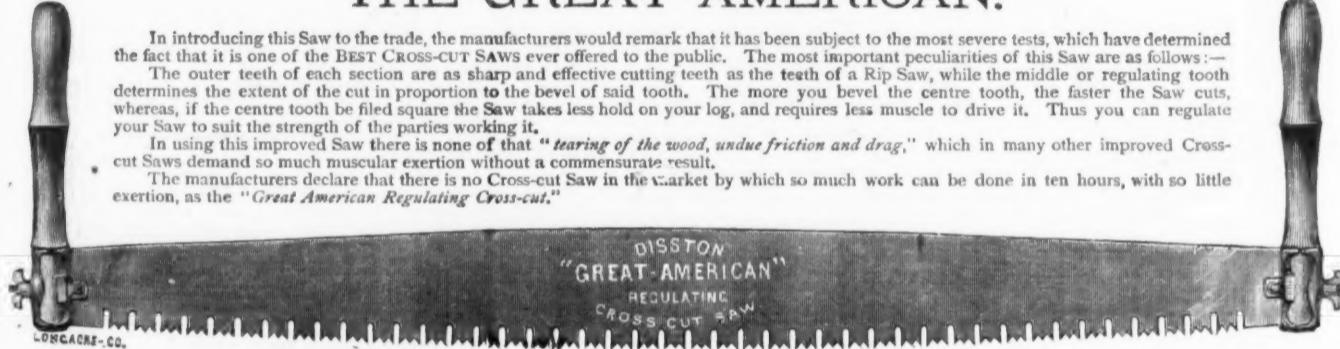
Front and Laurel Streets, Philadelphia.

Branch Works, Tacony, Philadelphia.

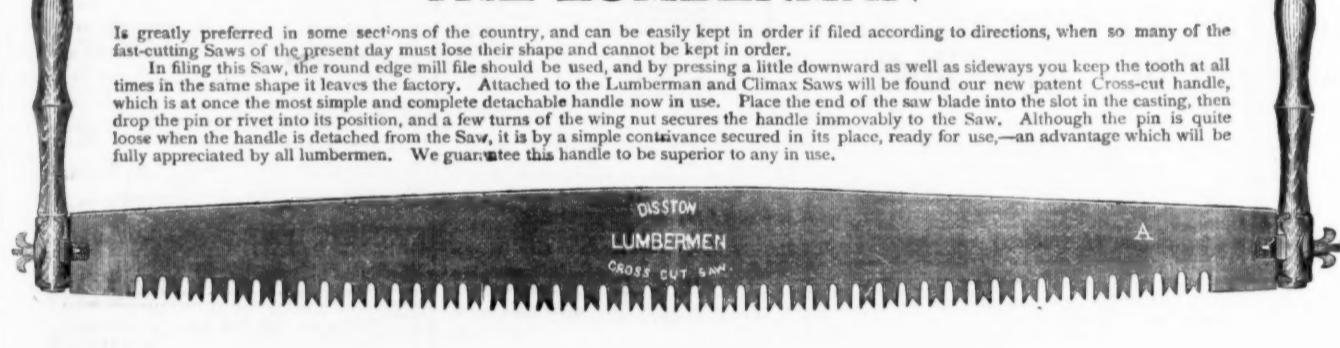
Branch House, Randolph & Market Streets, Chicago, Ill.

## Our Celebrated CROSS-CUT AND WOOD SAWS.

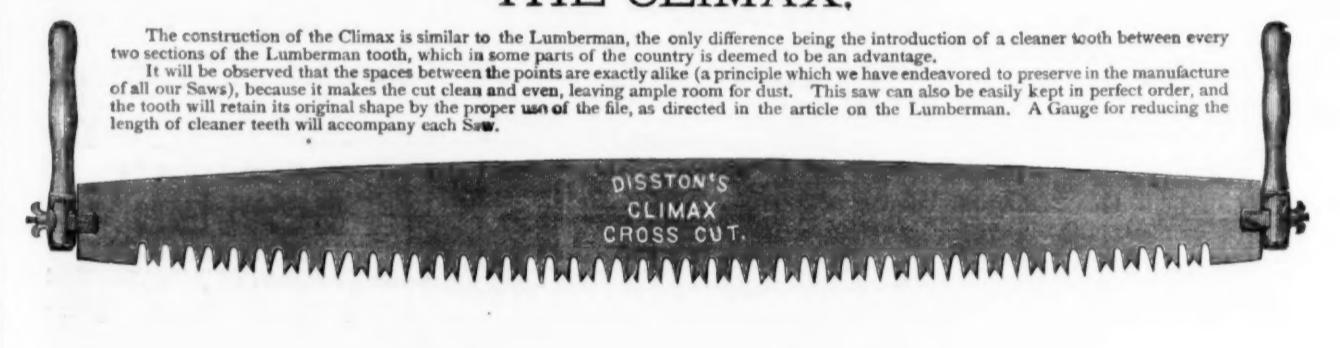
### THE GREAT AMERICAN.



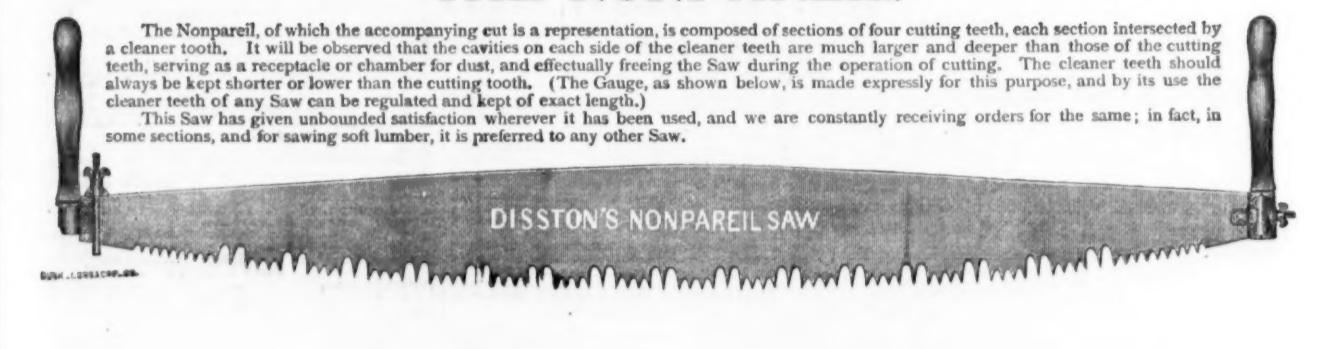
### THE LUMBERMAN



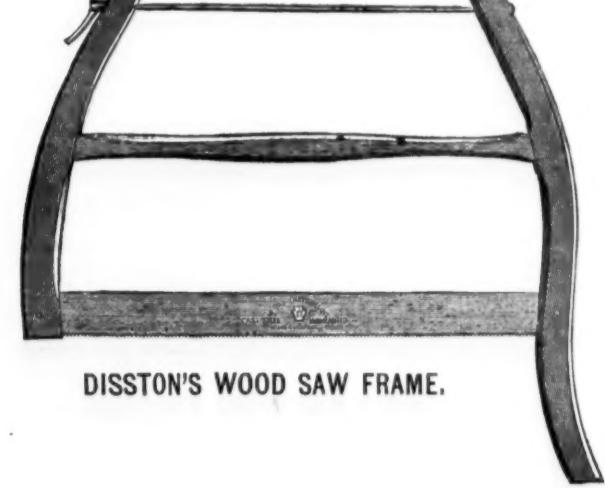
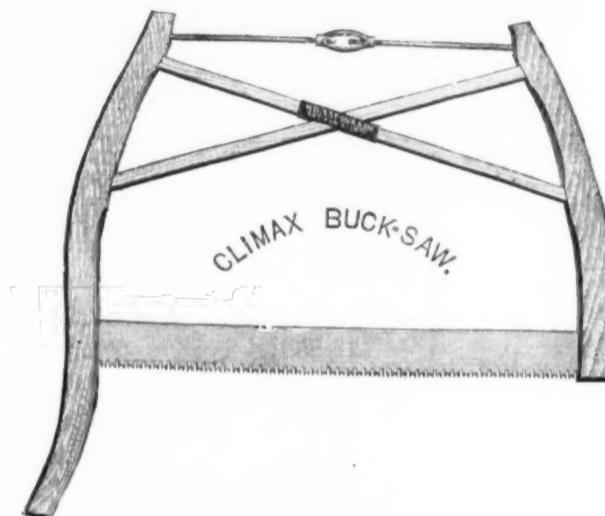
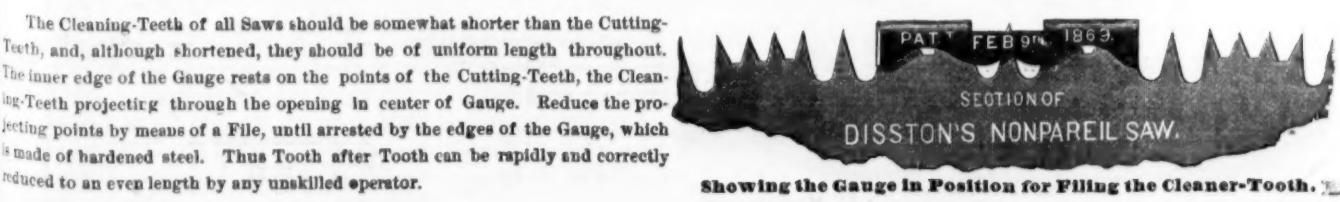
### THE CLIMAX.



### THE NONPAREIL.



### GAUGE FOR REGULATING CLEANING-TEETH.



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<b>Stocks and Dies.</b>	dis 5&10	
Hindstone Stone.	per lb 6c	
" Axe Stone.	per lb 8c	dis 20&10
" Wipe.	per lb 10c	
Fand Stone.	per lb 6c	dis 20&10
Wasbith Stone.	per lb 1c	dis 22 net
"	per lb 1c	
Arkansas Stone.	per lb 1c	dis 23 net
" Slips.	per lb 1c	dis 20 net
Grindstone, Family, J. F. Green & Bro.	per gross 6c	dis 30
Jewell Litzon's.	per gross 6c	dis 25
Gold Medal.	per gross 6c	dis 25
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Steel.	dis 50c	dis 50c
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Nickel Plated.	add \$2 50 @ \$4 00	per doz net
Try Squares and T Bevels.	dis 40c	
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Dixon's Try Squares.	dis 40c	
" Improved.	dis 40c	
<b>Tacks.</b>		
Full eight American Iron.	dis 15c 2c	per doz
Half eight American Iron.	dis 12c 1c	per doz
Carpet.	dis 7c 5c	per doz
Brads American Half Weight.	dis 50c	per doz
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Tubs.		
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Revised list.	dis 60c	per doz
Wires.		
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Bright and Annealed.	0 to 18 doz 40c to 45c	
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Buck & Union, Parallel.	dis 10c	
Buffalo, Parallel.	dis 10c	
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Tread & Parallel.	dis 15c	
Merrill's Parallel.	dis 20c	
Parker's Parallel.	dis 20c	
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Borden's Parallel.	dis 15c	
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Barwick & Union, Parallel.	dis 10c	
Buck & Union, Parallel.	dis 10c	
Buffalo, Parallel.	dis 10c	
Fisher & Co., Double Screw Parallel.	dis 15&20c	
Tread & Parallel.	dis 15c	
Merrill's Parallel.	dis 20c	
Parker's Parallel.	dis 20c	
Stephen's Parallel.	dis 15 to 20c	
Borden's Parallel.	dis 15c	
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Buck & Union, Parallel.	dis 10c	
Buffalo, Parallel.	dis 10c	
Fisher & Co., Double Screw Parallel.	dis 15&20c	
Tread & Parallel.	dis 15c	
Merrill's Parallel.	dis 20c	
Parker's Parallel.	dis 20c	
Stephen's Parallel.	dis 15 to 20c	
Borden's Parallel.	dis 15c	
Stearns' Saw Flies.	per dozen \$200 @ 20c	
Wheel Barrows.		
Cook (Fugley & Chapman).	new list dis 12c	
Coal, Green, Stone (Fugley & Chapman).	dis 25c	
Well Wheels.		
Revised list.	dis 60c	per doz
Wires.		
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Buck & Union, Parallel.	dis 10c	
Buffalo, Parallel.	dis 10c	
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Buck & Union, Parallel.	dis 10c	
Buffalo, Parallel.	dis 10c	
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"	19 to 20 doz 47c to 52c	
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"	23 to 24 doz 57c to 62c	
Convered.	0 to 18 doz 40c to 45c	
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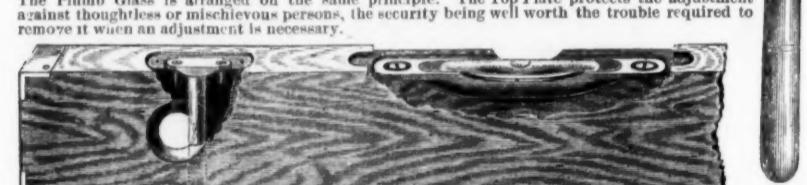
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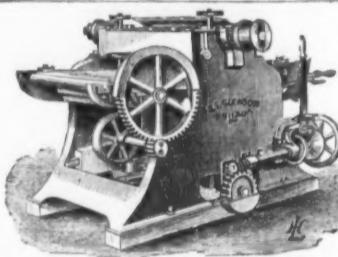
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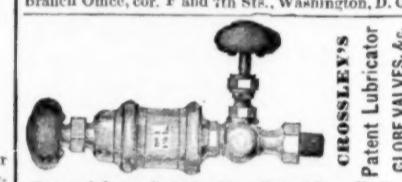
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Bennett Hotchkiss and  
N. C. Stiles' Patent.

This Drop which has been illustrated in this journal is of that class in which the Hammer is raised by a stirrup belt or board passing up between two friction rolls, and is so arranged that we will only describe our improved model. The first we are going to describe are those of BENNETT HOTCHKISS, which is an improvement on the one of Goulding and Cheney, was declared the first inventor and N. C. STILES. Our improvements consist:

First.—An arrangement of parts that makes it the most compact, of all other kinds for forcing. In addition to the upright rod, which is operated by the hand lever, there is a stirrup belt or board, and a lower end which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a stirrup, so that the action of the hammer will not injure the lever, thereby protecting the hand being injured, as otherwise would be the case.

Second.—The belt or board passes up between two friction rolls, and the stirrup belt or board is so arranged that they will freely open of themselves, but on closing they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressing the stirrup belt or board.

Third.—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The stirrup belt or board is made of wood, and the lower end of board is also made of wood. An adjustable collar on the upright rod allows the operator to obtain any height of blow desired automatically. The blow is wanted, press upon the stirrup belt or board, and the blow is given. Keep the foot upon the stirrup belt or board, and the blow will be repeated until the pressure is removed. If a blow is less high than the collar is set for it is required to press upon the stirrup belt or board, and the blow is given. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired height, so that the action of the hand or foot from the rest of the stirrup belt or board is slow, but it will stop and remain suspended at any point as soon as the pressure is removed.

The clamps in holding up the hammer keep the board from touching either roll and prevents the same from being worn uneven.

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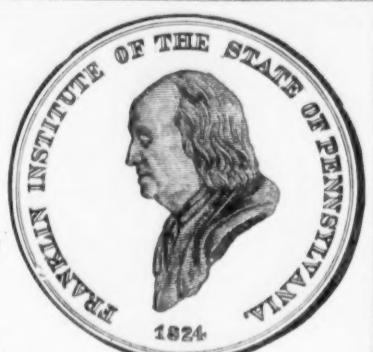
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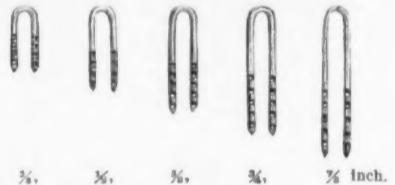
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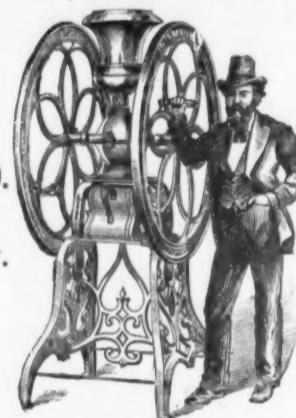
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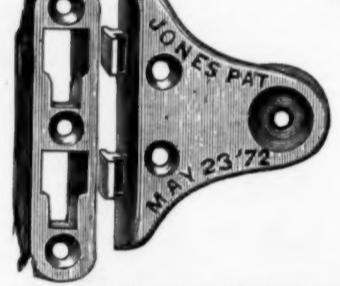
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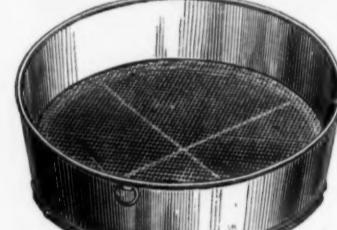
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PLYMOUTH, MASS., manufacturer of  
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Mann's Patent Metallic Sieve,  
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The best sieve in use. To be had of all dealers.  
A full assortment of these goods kept in stock  
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Patent Improved

**BAND SAW MACHINES**

For Bevel and Square Scroll Work and Re-sawing.

Manufacture six different sizes. Prices, \$165, \$210, \$250,

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The Whitewater Wagon has  
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tests of every section of the  
country, and on account of its quality  
of material and workmanship it is  
now used for the public service by  
both the United States and Canadian  
Governments. It may be  
found in the principal markets of  
the country, and at prices to  
compete with strictly first-class work.  
A Wagon is mounted two years  
before use. Ironing is heavier  
than any competing wagon. Its  
style and finish are very superior.  
A peculiar feature of the wagon  
gives lighter draft than any other  
wagon. Send for Catalogues and  
prices.

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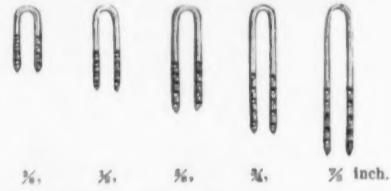
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**BUILDERS' HARDWARE.**



1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1 inch.

Have constantly on hand a large stock of

**Boardman's Blind Staples,**

Packed 10 pounds in wooden boxes, or furnished in  
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Prices furnished upon application.

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Hardware, Cutlery, &c.

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"BEAVER"  
(American)

FILES and HORSE RASPS.

CHALLENGE  
DOOR & GATE SPRING.

Rough & Ready  
And  
CLIPPER SCYTHES,  
Warranted.

PATENTED  
JULY 11<sup>th</sup> 1873.

Patented March 4, 1873.

Scandinavian or Jail Pad Locks.

**J. H. McWILLIAMS**, Manufacturer of PYES' PATENT PAD LOCKS.

Scandinavian or Jail Pad Locks.

With Shoulder.  
McWilliams' Patent.

Brown's Patent Flat Key.

Brass and Iron and with Chain.

Scandinavian or Jail Pad Locks.

With Shoulder.  
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Scandinavian or Jail Pad Locks

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Anvils.—Solid Cast Steel.	Per lb. 14c
Peter Wright's, (Advanced April 1st.)	Per lb. gold, 11 1/2c
Terms, 30 days. For 60 or 90 days, interest added at 0 per cent. per annum.	
Apple Parers.—Union.	Per dozen 47 50
Steelton.	7 50
Victor.	7 50
Domestic.	7 75
Reading.	7 75
Reading, "Pineapple" Coring and Slicing.	16 20
Angus.—Horned.	16 20
Axes.—Mann's Light.	Per dozen 12 00 to 11 50
Hunt's Light.	14 00 to 12 50
Red Indian, all sizes.	12 00 to 11 50
Red Indian, all sizes.	12 50 to 12 00
Crown Prince.	13 50 to 12 00
Anglers and Auger Bits.—Mierce's Pat.	Twelve Bits.
Twelve Bits.	10 50
Twelve Bits.	10 50 to 10 10
Common Bit.	10 50 to 10 10
Connex Bit.	10 50 to 10 10
Jennings Bits.	10 50 to 10 10
Bates' Nut Augers.	10 50 to 10 10
Douglas Nut Augers.	10 50 to 10 10
Watrous' Ship Augers.	10 50 to 15 15
Bonney's Pat. Hollow Augers.	12 50 to 15 15
Stearns' Patent Hollow Augers.	12 50 to 15 15
Bells.—	
Lander, Frary & Clark's.	Sold on Morton's List.
Morton's.	10 50
Chattillon.	10 50
Common Spikes.	10 50
Horn.	10 50
Bell.	10 50
Bell.—Iron Bros. Mfg. Co. Light Hand.	10 50
Common (Tissue Paper Weight).	10 50 to 10 10
Swing (Hand Bell).	10 50 to 10 10
Connell's, Dumb.	10 50 to 10 10
Gt. Western & Kentucky Cow.	10 50 to 10 10
Boring Machines.—Bates' Mfg. Co. complete with augers.	10 50 to 10 10
Common Boring Machines, no Augers.	9 00 to 9 10
Anzuan.	5 00 to 4 75
Bolts.—Eastern Carriage Bolts.	Special prices.
Wendell.	6 00
Philadelphia.	6 00
Eagle, (Coleman's).	6 00
Wrought Nut.	6 00
Stanley.	6 00
Bronze.—Bar.	10 50 to 10 10
Bronze.	10 50 to 10 10
Bartholomew's American Ball.	10 50 to 10 10
Snozard.	10 50 to 10 10
Bolts.—Cast Iron Joint. Narrow.	10 50 to 10 10
Brown.	10 50 to 10 10
Cast Fast Loose Joint.	10 50 to 10 10
Common.	10 50 to 10 10
Doyle Mfg. Co.	10 50 to 10 10
Common Bolts, no Augers.	10 50 to 10 10
Anzuan.	5 00 to 4 75
Bolts.—Eastern Carriage Bolts.	Special prices.
Wendell.	6 00
Philadelphia.	6 00
Eagle, (Coleman's).	6 00
Wrought Nut.	6 00
Stanley.	6 00
Bronze.	10 50 to 10 10
Bartholomew's American Ball.	10 50 to 10 10
Snozard.	10 50 to 10 10
Bolts.—Cast Iron Joint. Narrow.	10 50 to 10 10
Brown.	10 50 to 10 10
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Wrought Nut.	6 00
Stanley.	6 00
Bronze.	10 50 to 10 10
Bartholomew's American Ball.	10 50 to 10 10
Snozard.	10 50 to 10 10
Bolts.—Cast Iron Joint. Narrow.	10 50 to 10 10
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Bartholomew's American Ball.	10 50 to 10 10
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quality, temper, and adaptability in all respects to the various purposes  
for which it may be required. Hold a Century of practical experience  
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Isles principally of this Country, encourage us to solicit a universal  
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ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

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Reaper Bars, Saw Bars, &c., &c.

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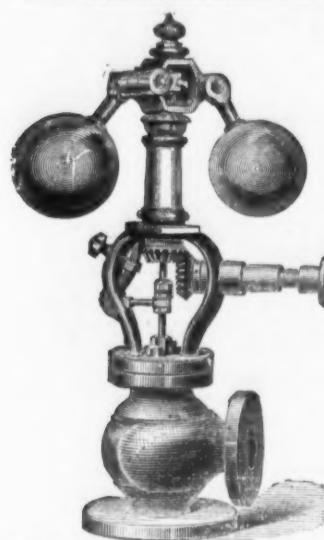
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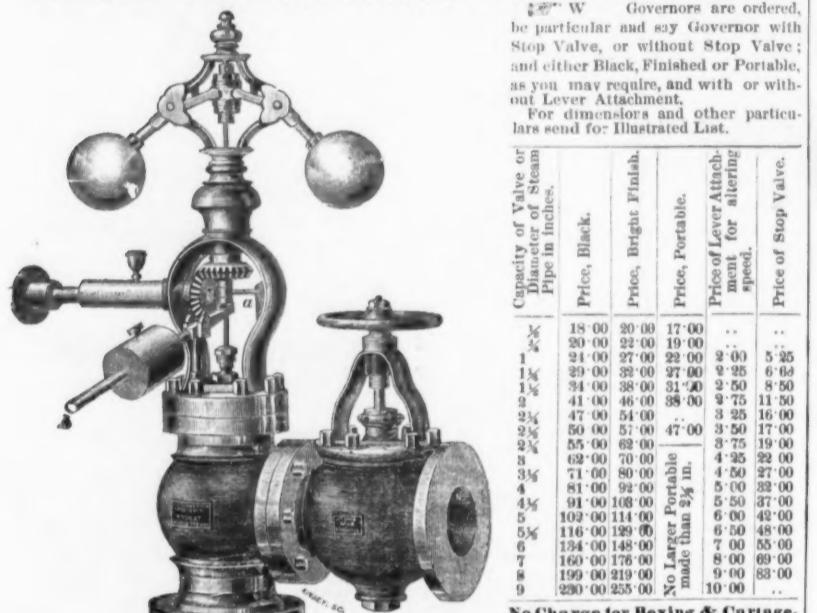
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1 1/2	34.00	38.00	31.00	2.25	8.50
2	41.00	46.00	38.00	2.75	11.50
2 1/2	47.00	51.00	47.00	3.50	17.00
3	50.00	55.00	47.00	3.50	19.00
3 1/2	55.00	62.00	47.00	3.75	22.00
4	62.00	70.00	47.00	4.25	22.00
4 1/2	71.00	80.00	47.00	4.50	27.00
5	81.00	92.00	50.00	5.00	32.00
5 1/2	91.00	103.00	50.00	5.50	37.00
6	102.00	114.00	60.00	6.00	42.00
6 1/2	116.00	125.00	60.00	6.50	47.00
7	125.00	135.00	60.00	7.00	53.00
7 1/2	150.00	176.00	80.00	6.00	69.00
8	199.00	219.00	90.00	9.00	83.00
9	230.00	255.00	100.00	10.00	..

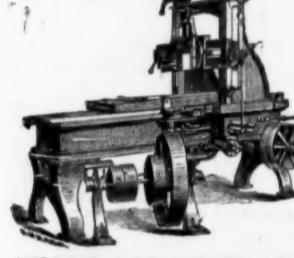
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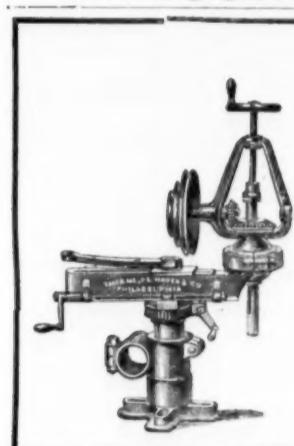
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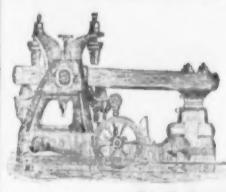
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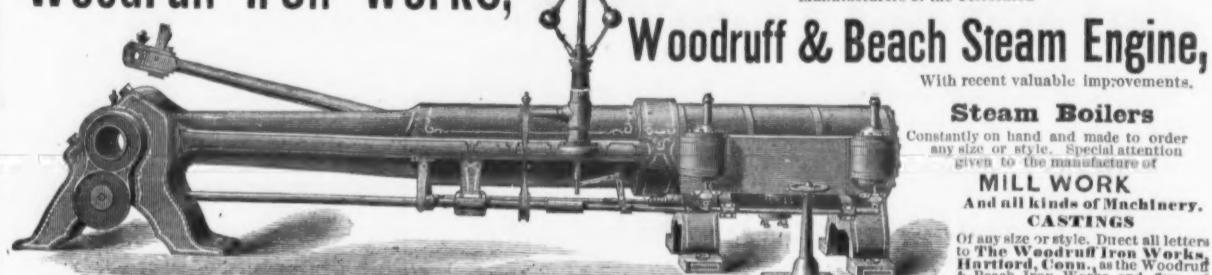
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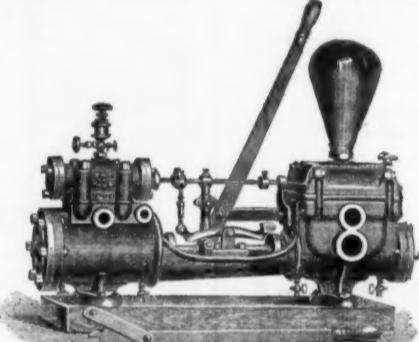
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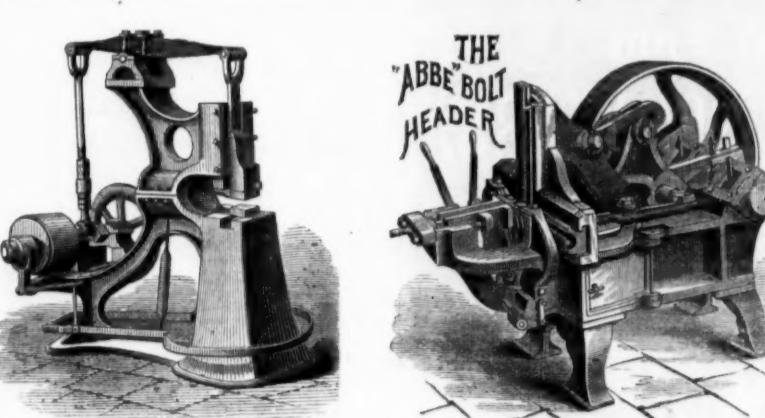
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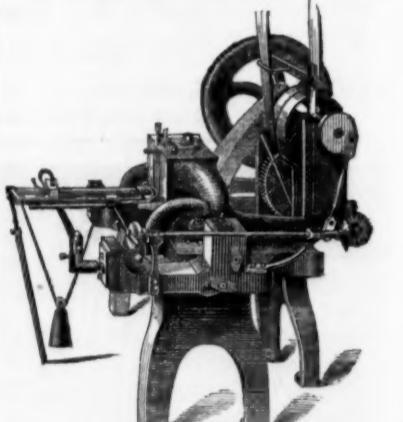
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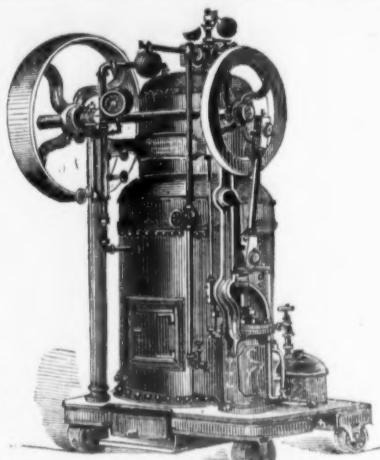
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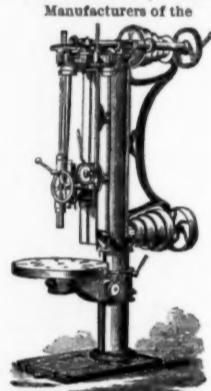
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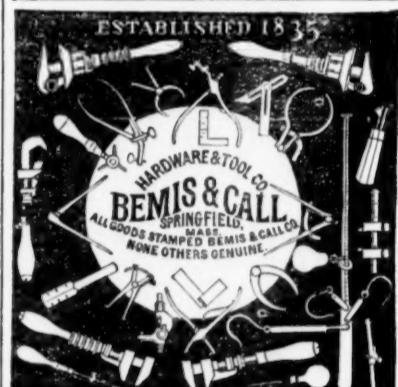
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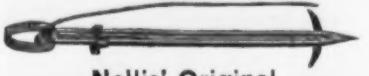
MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.  
CAST SHOVEL, HOE AND MACHINERY STEEL.BESSEMER TOE, SLEIGH AND TIRE STEEL.  
BESSEMER SHOVEL AND PLOW STEEL.

BESSEMER MACHINERY AND CULTIVATOR STEEL.

RE-ROLLED NORWAY SHAPES.  
NORWAY NAIL-RODS, ROLLED AND SLIT FROM SUPERIOR BRANDS.NEW TIME TABLE.  
Great Reduction in Time and Labor to the Farmer by using

Nellis' Original

## HARPOON HORSE HAY FORK,

Grapple and Pulley; also, Nellis' Patent Stacker and Method of conveying Hay, Straw, &amp;c. A ton of Hay can be delivered in three to five minutes to any part of Mow or Stack. The right of Stacker and Conveyer granted FREE to the Farmer purchasing our Horse Hay Fork and Fixtures during second half 1875.

Nellis' Grapple, with its Pulleys can be attached or detached to rafter or beam, without the use of a ladder.

NELLIS' PULLEY,

Improved Wrought Frame, Prepared Wood Wheel. Warranted superior to any Horse Fork Pulley offered in the market.

A trial of these goods will convince any farmer that he cannot afford to dispense with them, as their entire cost is often times saved by a single day's use.

Also manufacturers of all descriptions

Of Agricultural Steel &amp; Iron, Steel Tempered by Nellis' process to suit every kind of soil.

Prices and descriptive Catalogues of our goods furnished free. Address,

A. J. NELLIS & CO., Pittsburgh, Pa.  
SEMPLE, BIRGE & CO., St. Louis, Mo.  
General Agents for the Southwest.

ESTABLISHED 1840.

## R. E. DIETZ,

No. 54 & 56 Fulton, and  
29 & 31 Cliff Street, New York,

Manufacturer of the



Each mouse caught resets the Trap for another.

## TUBULAR

And Other

## PATENT LANTERNS

BRASS AND IRON

## JACK CHAINS.

STANLEY G. FLAGG &amp; CO.

PHILADELPHIA, PA.

Office and Warehouse,

No. 216 &amp; 218 N. THIRD ST.

Manufacturers of

## STEEL CASTINGS.

A Substitute for Steel and Wrought Forgings.

Circulars sent on application.

D. K. MILLER LOCK CO.

712 Cherry St., Philadelphia, Pa.

Security, Durability, Convenience.

IMPROVED SELF-LOCKING  
Brass Pad Locks.Made in the most substantial and compact manner, and are in every respect a superior article. We guarantee that they are longer than any other lock of the same size. Each lock furnished with two keys. Any number of locks or keys made to order. Adopted by the United States Government. Samples of No. 1 Lock sent to all parts from our receipt of 41<sup>st</sup>. Liberal Discounts to the Trade.

## GAS FIXTURES.

Lamps, Bronzes,

Equal to any made, in great variety, all of our own manufacture.

BRADLEY &amp; HUBBARD MFG. CO.,

SALESROOMS:  
21 & 23 Barclay, cor. Church St., NEW YORK.SCRANTON  
Brass Works,

J. M. EVERHART,

Manufacturer of Brass Work for Water, Gas and Steam. Brass Castings and Jobbing promptly attended to. SCRANTON, PA.

## 445 Miles of Pencils.

The Dixon Crucible Company, of Jersey City, received orders during the first week of this month for 28,000 gross, or, 4,032,000, of Dixon's American Graphite Pencils. It is hardly probable that so great a number of pencils was ever before ordered from any single manufacturer in the world in any one week.

Each pencil is seven inches in length, making 2,352,000 feet, or 445 miles, of pencils placed end to end!

To make these will require 83,000 feet of cedar lumber—an entire cargo from Tampa Bay, Florida, where a saw mill is run by the company to saw cedar boards for the Dixon pencils. They are packed in cases containing 50 gross each for shipment, requiring 560 cases and six freight cars to start these pencils from the works of the Dixon Company.

Russell, Burdsall & Ward,  
PORT CHESTER, N. Y.Manufacturers of  
Carriage, Tire, Plow, Stove  
AND OTHER

## BOLTS.

Carriage Bolts made from Best Square Iron, a Specialty.

## Headquarters for Door Springs.

WE MANUFACTURE

All the Leading kinds at lowest cash prices.

We GUARANTEE every one of

## The "Gem" Coil Springs

To be of Best Quality of Cast Steel Wire, and Excellent Temper.

Old Style Rod Springs,  
AND

Gray's Improved Rod Springs

Are warranted to be FIRST-CLASS in every respect.

## Van Wagoner &amp; Williams,

HARDWARE MANUFACTURERS,

82 Beekman Street, N. Y.

## DERBY SILVER CO., Derby, Conn.,

Manufacture the most reliable

## SILVER PLATED SPOONS &amp; FORKS.

They are plated by weight, and not by time or guess, containing 20 per cent. more silver than the usual standard, on a base of Nickel Silver, and finished by hand. Each article is guaranteed by the trade mark and warranted to give full satisfaction. We ask of the trade a fair and impartial test, assuring them that the high standard already attained, shall be maintained. Send for Catalogue and Price.

